



OHM Remediation
Services Corp.

1202 Kettner Boulevard
San Diego, California 92101



Suspended Fuel Tanks Site, Stained Areas
(Former Installation Restoration Program Site 15, Unit 1)
Marine Corps Air Station

El Toro, California

SWDIV Contract No. N68711-93-D-1459 — Delivery Order No. 0024 — Revision 0

OHM Project No. 17486 — Document Control No. SW3006 — April 9, 1997

Site Assessment Report

Appendix A - Memorandum of Transfer of Former IRP Site 15, Unit 1 to the Petroleum Corrective Action Program;
Appendix B - Analytical Results from Previous Investigation; Appendix C - Geophysical Survey Report;
Appendix D - Site Photographs; Appendix E - Curtis and Tompkins Analytical Results;
Appendix F - Nonhazardous Waste Manifest; Appendix G - Data Quality Assessment Report;
Appendix H - Land Surveying Data

Site Assessment Report

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1202 Kettner Boulevard
San Diego, California 92101

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Acronyms and Abbreviations

AOC	area of concern
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CA LUFT	California Leaking Underground Fuel Tank
CRWQCB	California Regional Water Quality Control Board
DO	Delivery Order
DQA	data quality assessment
EPA	United States Environmental Protection Agency
IAS	Initial Assessment Study
IRP	Installation Restoration Program
JEG	Jacobs Engineering Group Inc.
MCAS	Marine Corps Air Station
mg/kg	milligrams per kilogram
msl	mean sea level
OHM	OHM Remediation Services Corp.
ppm	parts per million
QA	quality assurance
QC	quality control
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SFT	Suspended Fuel Tanks
Station	Marine Corps Air Station, El Toro
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons

Section 1

Introduction

This Site Assessment Report summarizes the field activities conducted and the analytical results of soil samples collected at the Suspended Fuel Tanks (SFT) Site, Stained Areas (former Installation Restoration Program [IRP] Site 15, Unit 1) of the Marine Corps Air Station (MCAS), El Toro, California. This report is prepared by OHM Remediation Services Corp. (OHM) for Southwest Division Naval Facilities Engineering Command (SWDIV) under Contract No. N68711-93-D-1459, Delivery Order (DO) No. 0024.

Petroleum hydrocarbon presence in the soil at the former IRP Site 15, Unit 1 was reported by Jacobs Engineering Group Inc. (JEG) following an investigation in 1993. The results of soil samples collected at depths of 0 and 2 feet below ground surface (bgs) indicated that total petroleum hydrocarbons (TPH) as diesel ranged from <13.5 to 8,530 milligrams per kilogram (mg/kg), TPH as gasoline ranged from <0.05 to 21.1 mg/kg, and total recoverable petroleum hydrocarbons (TRPH) ranged from <20 to 23,034 mg/kg. However, the highest concentrations reported were detected in the near-surface soil.

In October 1995, the former IRP Site 15, Unit 1 was transferred from the IRP to the Petroleum Corrective Action Program under oversight of the California Regional Water Quality Control Board (CRWQCB). The joint transfer memorandum is included in Appendix A, Memorandum of Transfer of Former Site 15, Unit 1 to the Petroleum Corrective Action Program. In January 1996, OHM conducted site verification sampling to assess the vertical and lateral extent of petroleum hydrocarbon contamination at the site. The analytical results were then used to evaluate whether excavation of contaminated soil and subsequent treatment were required.

Based on the results of the site verification sampling and the excavation of petroleum hydrocarbon-affected soil, OHM, on behalf of MCAS, El Toro (the Station), recommends requesting closure for the former IRP Site 15, Unit 1.

Section 2

Environmental Setting

This section summarizes the general area surrounding the Station and the environmental setting in the vicinity of IRP Site 15, Unit 1. The location of the Station is shown in Figure 2-1, Facility Location Map, Former IRP Site 15, Unit 1.

2.1 Site Description

The Station is located approximately 45 miles southeast of Los Angeles in Orange County, California, 1 mile north of the intersection of Interstate 5 (Santa Ana Freeway) and Interstate 405 (San Diego Freeway). The Station covers approximately 4,700 acres, and is located on the southeastern edge of the Tustin Plain, which slopes gently to the west-southwest. The Station crosses the Tustin Plain and extends eastward into the Santa Ana Mountains. Land surface elevations are approximately 215 feet above mean sea level (msl) at the western corner and rise to approximately 800 feet above msl at the eastern corner (JEG, 1993).

During the Phase I Remedial Investigation (RI), Site 15 consisted of an unpaved, fenced area located in the western edge portion of MCAS El Toro, north of Building 31 and west of Building 29 along West Marine Way. The site is relatively flat, and lies at an elevation of about 260 feet msl. The area investigated consisted of two areas where stained soil was evident beneath two former elevated diesel fuel tanks (JEG, 1993).

Based on regulatory request, Site 15 was expanded to include an area adjacent to Building 31. This area includes Solid Waste Management Unit/area of concern (SWMU/AOC) 273 (a hazardous waste storage area) and the associated drainage ditch. For the Phase II Remedial Investigation/Feasibility Study (RI/FS), the IRP Site 15 consists of two units — the Stained Areas (Unit 1) and the SWMU/AOC 273 (Unit 2) (Bechtel National, Inc. [BNI], 1996). Unit 1 (current target area of investigation) remains the 2,400 square feet of unpaved areas where stained soil was evident beneath the two former 500-gallon elevated diesel tanks (Figure 2-2, Site Location Map, Former IRP Site 15, Unit 1).

2.2 Geology

The Station is situated on alluvial fan deposits derived mainly from the Santa Ana Mountains. These Holocene materials consist of isolated, coarse-grained, stream-channel deposits contained within a matrix of fine-grained overbank deposits that range in thickness to 300 feet (Herndon and Reilly, 1989).

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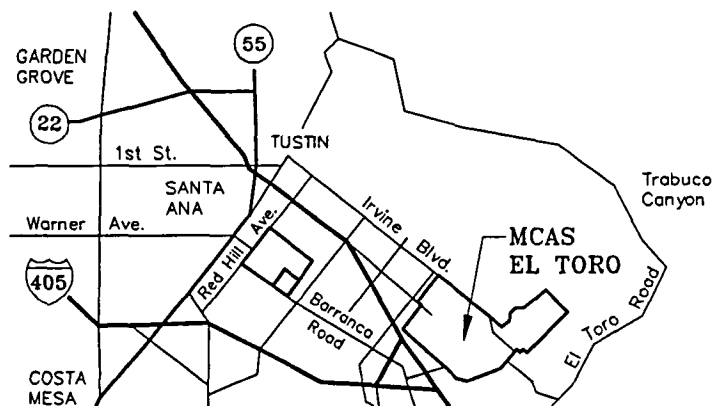
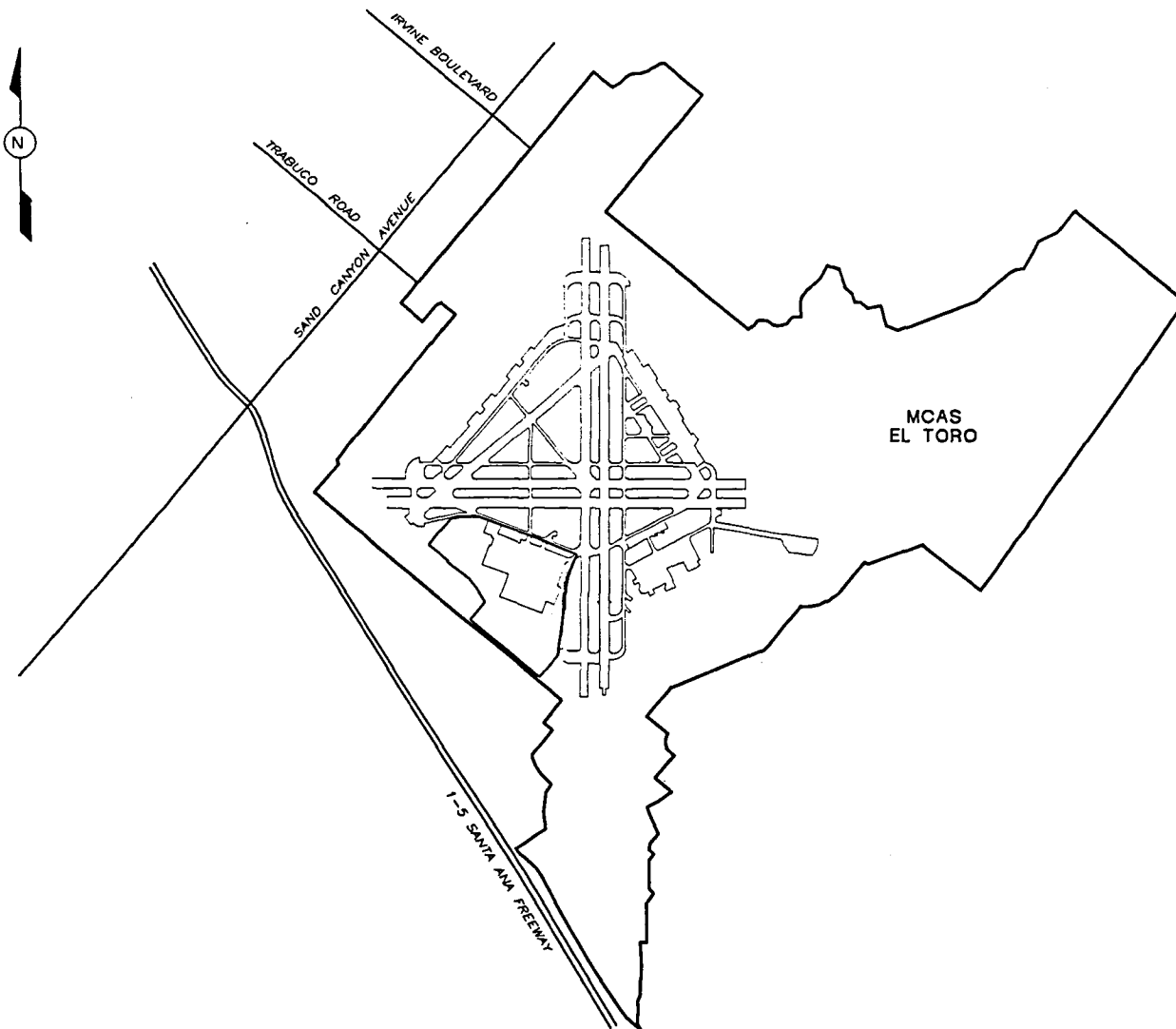
FIGURES 2-1 AND 2-2

FOR ADDITIONAL INFORMATION, CONTACT:


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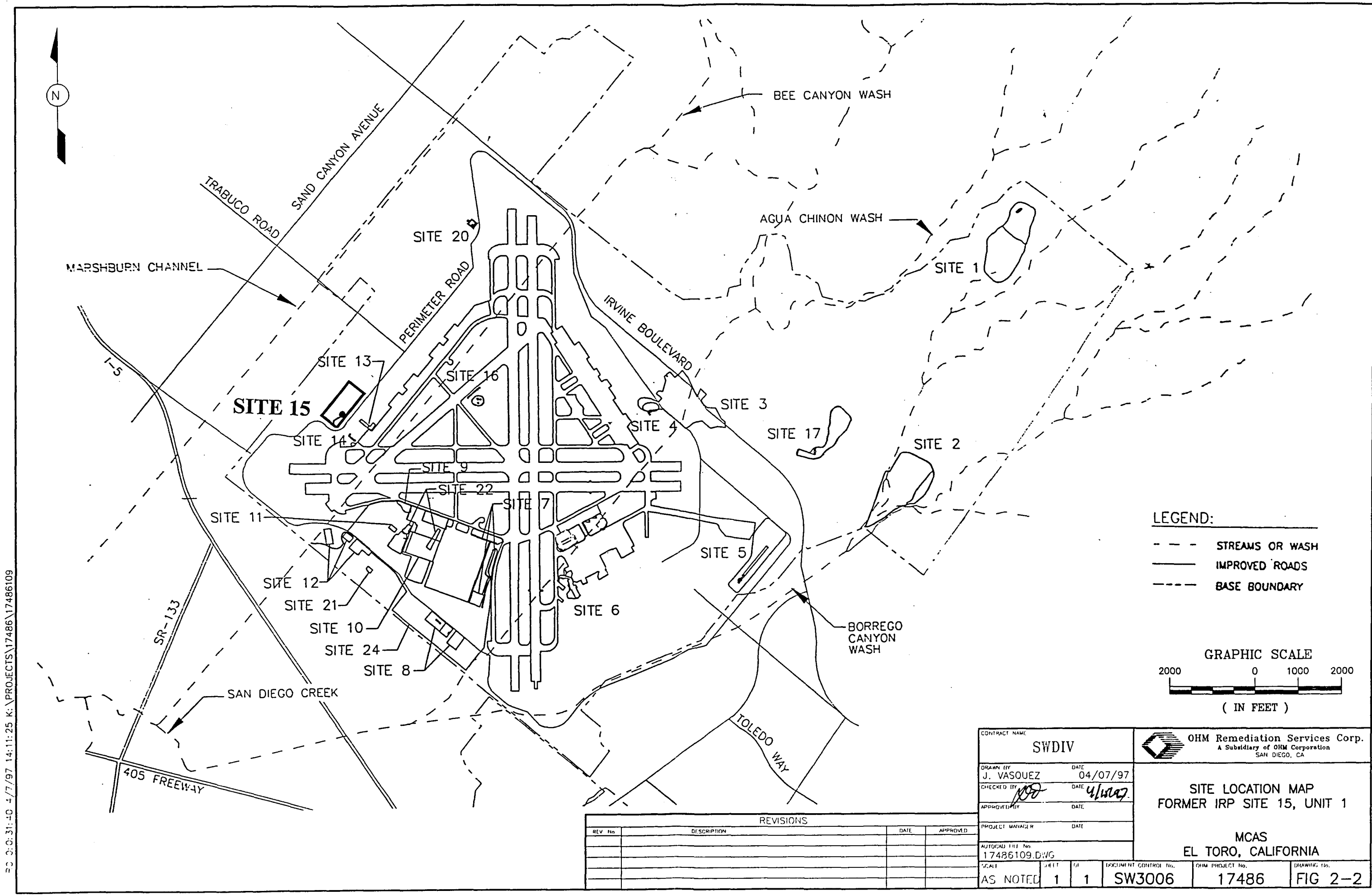
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 OHM Remediation Services Corp. A Subsidiary of OHM Corporation SAN DIEGO, CA				DRAWN BY: J. VASQUEZ CHECKED BY: [Signature] APPROVED BY: _____ PROJECT MANAGER: _____		DATE: 03/12/97 DATE: 4/10/97 DATE: _____ DATE: _____		FACILITY LOCATION MAP FORMER IRP SITE 15, UNIT 1 MARINE CORPS AIR STATION TUSTIN, CALIFORNIA					
CONTRACT NAME: SWDIV				SCALE: NONE		DOCUMENT CONTROL No.: SW3006		OHM PROJECT No.: 17486		FIGURE No.: FIG 2-1		REVISION: 0	
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The Holocene alluvial materials conform and overlie Pleistocene Age sediments that are predominantly composed of interlayered fine-grained lagoonal and near shore marine deposits. These materials become increasingly mixed with beach sands, terrace, and stream-channeled deposits in the eastern portion of the Tustin Plain and along the plain edges. Thus, the Quaternary deposits form a heterogeneous mixture of silts and clays with interbedded sands and fine gravels that range in thickness up to 500 feet in the western portion of the Tustin Plain (Singer, 1973).

2.3 Hydrogeology

The Station lies within the Irvine Groundwater Sub Basin (Irvine Sub Basin). The Irvine Sub Basin is located southeast of and adjacent to the main Orange County Groundwater Basin.

Regional groundwater flow has been to the west and northwest since the 1940s. It has been controlled locally by large groundwater withdrawal depressions. From 1969 to 1982 an average gradient of 0.0046 to the northwest was reported in the principal aquifer zone of the Irvine area (Banks, 1984). Phase I RI data indicate similar groundwater flow direction and a slightly higher gradient of 0.008 (JEG, 1993).

The depth to groundwater beneath the station ranges from approximately 45 feet bgs in the foothills to 240 feet bgs in the deepest portion of the Irvine Sub Basin located within the Station. The depth to groundwater in the vicinity of former IRP Site 15, Unit 1, based on available water level data from monitoring well 15_DBMW51, is approximately 120 feet (CDM, 1996).

Section 3

Site History and Previous Investigations

This section describes the previous work and background information relevant to former IRP Site 15, Unit 1.

3.1 Former IRP Site 15, Unit 1 History

Historically, the IRP Site 15 (the SFT Site) is part of a fenced storage yard, which is a maintenance and utilities shop for Wing Engineering Squadron 37. The storage yard was used for storage and maintenance of military vehicles and equipment, including cranes, tractors, front-end loaders, bulldozers, power generators, and refrigeration equipment. Between 1979 and mid-1984, an aboveground fuel storage area containing two 500-gallon aboveground diesel tanks with the associated piping and fuel dispensing equipment also existed in the yard. Diesel fuel reportedly leaked from the tank hoses and nozzles onto the ground during the entire period of the tanks' existence. It is estimated that 500 gallons of diesel fuel leaked to the ground before the tanks were reportedly removed in 1984 (JEG, 1993).

Following regulatory request, Site 15 was expanded to include an area adjacent to Building 31. This area consists of SWMU/AOC 273 (a hazardous waste storage area) and the associated drainage ditch. For the Phase II RI/FS, the IRP Site 15 consists of two units - the Stained Areas (Unit 1) and the SWMU/AOC 273 (Unit 2). Unit 1 (current target area of investigation) consists of the 2,400 square feet of unpaved areas where stained soil was evident beneath the two former 500-gallon elevated diesel tanks. The Unit boundaries were determined by consensus among the Navy and, the state and federal regulatory agencies prior to initiation of the Phase I RI. In October 1995, Unit 1 was removed from the IRP by the Base Realignment and Closure Cleanup Team based on Comprehensive Environmental Response, Compensation, and Liability Act petroleum exclusion (BNI, 1996).

3.2 Former IRP Site 15, Unit 1 Previous Investigation and Soil Sampling Results

In 1985, identification of potentially contaminated sites at the Station began through an Initial Assessment Study (IAS) under the Navy Assessment and Control of Installation Pollutants Program. The assessment was reportedly conducted by Brown and Caldwell Engineers. The IAS identified the potentially contaminated sites through records search,

on-site survey, and employee interviews. The former IRP Site 15, Unit 1 was identified in the IAS report (Brown and Caldwell, 1986). In 1988, the Site was also part of the IAS sites targeted for a Site Inspection Plan of Action, which provided a plan for verification study at each of the IAS sites (James M. Montgomery Engineers, 1988).

In 1993, a Phase I RI was conducted (JEG, 1993) under the IRP by JEG under Navy Contract No. N68711-89-D-9296. The investigation and sampling activities conducted under the IRP were to assess the nature and extent of contamination at the IAS identified sites including the former IRP Site 15, Unit 1. Soil samples were collected at depths of 0 and 2 feet bgs. The results of the investigation indicate TPH as diesel ranged from <13.5 to 8,530 mg/kg, TPH as gasoline ranged from <0.05 to 21.1 mg/kg, and TRPH ranged from <20 to 23,034 mg/kg. Low levels of volatile organic compounds and semivolatile organic compounds were also detected. However, the highest petroleum hydrocarbon concentrations reported in the Phase I RI for the site were detected in the near-surface soil. A copy of the analytical results from JEG investigation is included in Appendix B, Analytical Results from Previous Investigation.

Section 4

Field Verification Activities

Field verification sampling was conducted by OHM in January 1996 to verify the presence of petroleum hydrocarbon contamination in the near-surface soil at the former IRP Site 15, Unit 1 as reported by JEG in 1993, and to assess the vertical and lateral extent of the petroleum contamination. Field activities included a geophysical survey, hand augering and soil samples collection, laboratory analysis of soil samples, a site survey, and field quality assurance/quality control (QA/QC) checks. Work was performed in general accordance with the following DO 0024 documents: Draft Work Plan, Draft Contractor Quality Control Plan Addendum (OHM, 1995), Draft Waste Management Plan (OHM, 1996).

4.1 Utility Clearance and Geophysical Survey

Prior to starting OHM field activities at the site, a geophysical survey was conducted by an OHM subcontractor, ULS Services Company, in December of 1995 to locate the underground utilities in the investigation area. The survey zone was identified as a topographically flat open area enclosed in a compound area in the vicinity of the southwest corner of Building 29. The ground surface consists of light brown to dark tan silty clay-clayey silt material. A sewer manhole was identified near the east side of the survey zone. Sewer piping runs north-south as observed from the manhole inspection. Ground penetration radar and electromagnetic induction metal detector metallic residue surveys were not performed at this site since it was reported as an aboveground storage tank site. Geophysical survey data for the former IRP Site 15, Unit 1 are included in Appendix C, Geophysical Survey Report.

4.2 Verification Soil Sampling and Analysis

Verification soil sampling was conducted at the site between January 29 and February 29, 1996. Eight soil borings were hand augered to approximately 6 inches bgs in the same vicinity as the previous samples collected during the JEG investigation. Samples were collected using a hand auger with 2- by 6-inch brass sleeves.

A total of 10 soil samples, including 1 field duplicate sample for QA/QC, and 1 equipment rinsate sample were collected. Soil sampling locations are shown in Figure 4-1, Soil Sampling Locations (First Round Samples), Former IRP Site 15, Unit 1. Site photographs are included in Appendix D, Site Photographs.



SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB05-S-252	SURFACE	75	ND/ND/ND/ND
96-IRP15-SB05-S-256	0.5	980	ND/41/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB06-S-253	0.5	700	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB07-S-254	0.5	100	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB08-S-255	0.5	ND	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB04-S-251	0.5	6800	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB03-S-250	0.5	ND	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB02-S-249	0.5	ND	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-SB01-S-248	0.5	ND	ND/ND/ND/ND

EXPLANATION:

- SOIL SAMPLE LOCATIONS
- TPH-D TOTAL PETROLEUM HYDROCARBON AS DIESEL
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, TOTAL XYLENES
- ND NOT DETECTED ABOVE LABORATORY REPORTING LIMITS AS SHOWN IN TABLE 2-3
- PPM PARTS PER MILLION
- PPB PARTS PER BILLION
- ID IDENTIFICATION



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DRAWN BY J. VASQUEZ DATE 04/07/97
CHECKED BY *[Signature]* DATE 4/9/97
APPROVED BY DATE
PROJECT MANAGER DATE

**SOIL SAMPLING LOCATIONS
(FIRST ROUND SAMPLES)
FORMER IRP SITE 15, UNIT 1
MCAS
EL TORO, CALIFORNIA**

AUTOCAD FILE No.	PLOT SCALE	SHEET	OF	SCALE	DOCUMENT CONTROL No.	OHM PROJECT No.	FIGURE No.	REVISION
17486101.DWG	1=1	1	1	NONE	SW3006	17486	FIG 4-1	0

4-2

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Sampling equipment was decontaminated before the collection of each sample. Sample sleeves retained for analysis were covered on each end with Teflon™ sheeting and plastic end caps, labeled, and placed in an ice chest maintained at 4 ± 2 degrees Celsius. The samples were transported off site under chain-of-custody protocol to Curtis and Tompkins, a California-certified, Naval Facilities Engineering Service Center-approved laboratory. The samples were analyzed for TPH as diesel and TPH as gasoline using California Leaking Underground Fuel Tank (CA LUFT) Method 8015 Modified, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using United States Environmental Protection Agency Method 8020. One trip blank prepared and supplied by the laboratory for volatile organic compound analysis was shipped with the soil sample cooler.

The laboratory analytical results showed concentrations of TPH as diesel ranging from "not detected" to 6,800 parts per million (ppm). Benzene, ethylbenzene and total xylenes showed "not detected" in all 10 samples. Toluene concentrations in the samples also showed "not detected" except in one sample, which indicated 41 parts per billion. Summary of the analytical results are shown in Table 4-1, OHM First Round Sampling Analytical Results (January 29, 1996), Former IRP Site 15, Unit 1. A copy of the laboratory analytical results is provided in Appendix E, Curtis and Tompkins Analytical Results.

Based on the high concentration of TPH as diesel in the surface and near-surface soil and the potential for exposure to site workers from these chemicals, on February 29, 1996 OHM excavated the top 18 inches of soil within an affected area of approximately 20 feet by 60 feet using a backhoe. The excavated soil was stockpiled on-site, sampled, and on April 18, 1996 subsequently transported by West Coast Sand and Gravel Co. to Candaleria Landfill located in Azusa, California for disposal. The nonhazardous waste manifest is included in Appendix F, Nonhazardous Waste Manifest. Approximately, 90 tons of excavated soil was disposed off site. At the completion of the excavation, a second round of soil samples were collected from the residual soil to verify that any petroleum hydrocarbon-affected soil was effectively removed. A total of six samples, including one QA/QC sample and one equipment rinsate sample, were collected in the second round of sampling.

The analytical results of the second round of soil samples showed concentrations of TPH as diesel ranging from "not detected" to 610 ppm. BTEX showed "not detected" in all soil samples. Summary of the analytical results are shown in Table 4-2, OHM Second Round Sampling Analytical Results (February 29, 1996), Former IRP Site 15, Unit 1. A copy of the laboratory analytical results is also provided in Appendix E. The second round soil sampling locations are shown in Figure 4-2, Soil Sampling Locations (Second Round Samples), Former IRP Site 15, Unit 1.

Table 4-1
OHM First Round Sampling Analytical Results (January 29, 1996)
Former IRP Site 15, Unit 1

Sample Identification	Sample Depth (feet)	Date Sampled	TPH as diesel (ppm)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)
Cleanup Goal			10,000 ppm	1 ppm	50 ppm	50 ppm	50 ppm
96-IRP 15-SB01-S-248	0.5	1/29/96	ND (11) ^a	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)
96-IRP 15-SB02-S-249	0.5	1/29/96	ND (11)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)
96-IRP 15-SB03-S-250	0.5	1/29/96	ND (11)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)
96-IRP 15-SB04-S-251	0.5	1/29/96	6,800	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)
96-IRP 15-SB05-S-252	Surface	1/29/96	75	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)
96-IRP 15-SB06-S-253	0.5	1/29/96	700	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)
96-IRP 15-SB07-S-254	0.5	1/29/96	100	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)
96-IRP 15-SB08-S-255	0.5	1/29/96	ND (11)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)
96-IRP 15-SB05-S-256	0.5	1/29/96	980	ND (5.3)	41	ND (5.3)	ND (5.3)
96-IRP 15-ER-257	ER	1/29/96	ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
96-TB-W-258	NA	1/29/96	ND (11)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)

Explanation:^a - analyte detection limit in parenthesis

ER - equipment rinsate

IRP - Installation Restoration Program

NA - not applicable

ND - not detected above the method detection limit for that compound

ppb - parts per billion

ppm - parts per million

TB - trip blank

TPH - total petroleum hydrocarbons

Table 4-2**OHM Second Round Sampling Analytical Results (February 29, 1996)****Former IRP Site 15, Unit 1**

Sample Identification	Sample Depth (feet)	Date Sampled	TPH as diesel (ppm)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)
Cleanup Goal			10,000 ppm	1 ppm	50 ppm	50 ppm	50 ppm
96-0229-W-TB	TB	2/29/96	NA	ND (0.5) ^a	ND (0.5)	ND (0.5)	ND (0.5)
96-IRP 15-S-269	0.5	2/29/96	ND (11)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)
96-IRP 15-S-270	0.5	2/29/96	28	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)
96-IRP 15-S-271	0.5	2/29/96	ND (11)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)
96-IRP 15-S-272	0.5	2/29/96	350	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)
96-IRP 15-S-273	0.5	2/29/96	140	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)
96-IRP 15-S-274	0.5	2/29/96	610	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)

*Explanation:**^a - analyte detection limit in parenthesis**IRP - Installation Restoration Program**NA - not applicable**ND - not detected above the method detection limit for that compound**ppb - parts per billion**ppm - parts per million**TB - trip blank**TPH - total petroleum hydrocarbons*



SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-S-273	0.5	140	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-S-272	0.5	350	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-S-271	0.5	ND	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-S-270	0.5	28	ND/ND/ND/ND

SAMPLE ID	DEPTH (FEET)	TPH-D (PPM)	BTEX (PPB)
96-IRP15-S-269	0.5	ND	ND/ND/ND/ND

LIMITS OF EXCAVATION

DIRT

6' FENCE

GUY WIRE

8' FENCE

STEEL PLATE

ER

BLDG 31

EXPLANATION:

- SOIL SAMPLE LOCATIONS
- TPH-D TOTAL PETROLEUM HYDROCARBON AS DIESEL
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, TOTAL XYLENES
- ND NOT DETECTED ABOVE LABORATORY REPORTING LIMITS AS SHOWN IN TABLE 2-3
- PPM PARTS PER MILLION
- PPB PARTS PER BILLION
- ID IDENTIFICATION



OHM Remediation Services Corp.
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PROJECT

SWDIV

DRAWN BY J. VASQUEZ DATE 04/07/97
CHECKED BY *[Signature]* DATE 4/15/97
APPROVED BY DATE
PROJECT MANAGER DATE

**SOIL SAMPLING LOCATIONS
(SECOND ROUND SAMPLES)
FORMER IRP SITE 15, UNIT 1
MCAS
EL TORO, CALIFORNIA**

AUTOCAD FILE No.	PLOT SCALE	SHEET	OF	SCALE	DOCUMENT CONTROL No.	OHM PROJECT No.	FIGURE No.	REVISION
17486100.DWG	1=1	1	1	NONE	SW3006	17486	FIG 4-2	0

46

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Following receipt of the analytical results for the second round of sampling and with the concurrence of the Remedial Project Manager, the excavation was backfilled in accordance with the requirements of Navy Specifications for unpaved areas. The excavation was backfilled with nonimpacted road base type soil imported from West Coast Sand and Gravel. Backfill materials were free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious or objectionable materials. Backfilling and compaction was conducted with a roller wheel mounted on a backhoe.

4.3 Quality Assurance/Quality Control

A site Contractor Quality Control Engineer was present during field activities to ensure that the OHM Work Plan was followed and implemented.

Field QC samples were analyzed during the project to assess the consistency of the sampling program and to evaluate the precision and accuracy of analytical data. Field QC samples for the former IRP Site 15, Unit 1 consisted of one field duplicate sample, one trip blank sample, and one equipment rinsate sample.

The field duplicate sample was collected at the same time, from the same source, and at a frequency of 10 percent of the total project samples. The identity of the duplicate sample was withheld from the laboratory. The duplicate sample was collected to assess the overall quality of the sampling effort.

The equipment rinsate sample was collected from final rinse of the sampling equipment after the decontamination procedure had been performed. The rinsate sample was collected to assess if the sampling equipment was properly decontaminated between the collection of samples.

The trip blank was prepared and supplied by the laboratory, and was shipped with the soil sample cooler containing samples to be analyzed for BTEX. A trip blank was used as a check of the sample shipping container preparations and transportation methods.

A data quality assessment (DQA) was performed by OHM on the soil samples collected from the site. The purpose of the DQA is to determine whether the data are of acceptable quality for the intended usage. A copy of the DQA is included in Appendix G, Data Quality Assessment Report.

4.4 Land Surveying

At the completion of soil sampling activities, all sample locations at the former IRP Site 15, Unit 1 were surveyed by OHM subcontractor, Towill Inc., a California-registered land surveyor. The surveyed locations were measured to ± 0.1 foot horizontally and tied to

the California State Plane Coordinate Systems, North American Datum 1983. The surveyed locations were also measured to +0.01 foot vertically and tied to msl. A copy of the surveyed data for IRP Site 15, Unit 1 are included in Appendix H, Land Surveying Data.

Section 5

General Risk Appraisal

Target cleanup levels for the petroleum hydrocarbon contaminants at the various former underground storage tank sites at the Station were proposed in the *Draft Work Plan for the Remediation of Various Underground Storage Tanks at MCAS El Toro, California* (OHM, 1995) in accordance with the guidelines of the CA LUFT Field Manual, (California State Water Resources Control Board, 1989). Table 2-1 from the CA LUFT Field Manual was used to estimate the site-specific concentrations of TPH and BTEX that may remain in the subsurface soil at the site without posing a threat to groundwater quality. The table uses a numerical scoring approach based on assigning a point score (10, 9, 5 or 0) for a particular site feature. Lower scores indicate a greater risk to groundwater. The point score is summed for all site features to produce a final score. The maximum possible score is 50 points, demonstrating a minimal threat to groundwater resources. Based on the final score, the maximum allowable levels for TPH and BTEX in the soil are provided.

Former IRP Site 15, Unit 1 was evaluated using the approach described above, and scored a total of 49 points, out of a possible 50. Table 2-1 from the CA LUFT Field Manual was modified to include the scoring results for the site. The results are presented in Table 5-1, Leaking Underground Fuel Tank Table. Based on this score, the maximum allowable levels for the site are as follows:

- benzene - 1 ppm
- toluene- 50 ppm
- ethylbenzene- 50 ppm
- total xylenes - 50 ppm
- TPH as gasoline - 1,000 ppm
- TPH as diesel - 10,000 ppm

Note: 1 ppm is equivalent to 1 mg/kg.

Analytical results from soil samples collected during the field verification activities at the former IRP Site 15, Unit 1 indicate that TPH as diesel, TPH as gasoline, and BTEX are "not detected", and are below the CA LUFT Field Manual guidelines for maximum allowable soil levels.

Table 5-1
Leaking Underground Fuel Tank Table
Former IRP Site 15, Unit 1
Leaching Potential Analysis for Gasoline and Diesel using BTEX

Table 5-1 was designed to estimate the concentrations of TPH and BTEX that can be left in place without threatening groundwater. Three levels of TPH and BTEX concentrations were derived (from modeling) for sites that fall into categories of low, medium, or high leaching potential. To use the table, find the appropriate description for each of the features. Score each feature using the weighting system shown at the top of each column. Add the points for each column and total. Match the total points to the allowable TPH and BTEX levels.

Site Feature	S C O R E	Score 10 points if condition is met	S C O R E	Score 9 points if condition is met	S C O R E	Score 5 points if condition is met
Minimum depth to groundwater from the soil sample (feet) ¹	10	>100	--	21-100	--	25-50 ²
Fractures in subsurface (applies to foothills or mountain ranges)	10	None	--	Unknown	--	Present
Average annual precipitation (inches)	--	<10	9	10-25	--	26-40 ³
Manmade conduits, which increase vertical migration of leachate	10	None	--	Unknown	--	Present
Unique site features: recharge area, coarse soil, nearby wells, etc.	10	None	--	At least one	--	More than one
Column Totals Total Points	40	+	9	+		= 49
Range of Total Points	49 Points or more		41-48 Points		40 Points or less	
Maximum Allowable B/T/E/X Levels	1/50/50/50		3/3/1/1		NA ⁴	
Maximum Allowed TPH	Gasoline	1,000		100		10
	Diesel	10,000		1,000		100

Explanation:

¹ Nearest monitoring well 15_DBMW51 groundwater depth (130 feet) was used as a reference for the depth of the groundwater at this site.

² If depth is greater than 5 feet but less than 25 feet, score 0 points. If depth is 5 feet or less, this table should not be used.

³ If precipitation is over 40 inches, score 0 points.

⁴ Levels for BTEX are not applicable at a TPH concentration of 10 ppm (gasoline), or 100 ppm diesel.
 (For explanation see page 6, page 27 of October 1989 California Leaking Underground Fuel Tank Field Manual.)
 ppm - parts per million

Section 6

Discussions

Soil sampling conducted by JEG at the former IRP Site 15, Unit 1 during the Phase I RI, indicates the presence of TPH as diesel, TPH as gasoline and TRPH in the maximum concentrations of 8,530 mg/kg, 21.1 mg/kg, and 23,034 mg/kg, respectively. The highest petroleum hydrocarbon concentrations were detected in the near-surface soil samples.

OHM collected soil samples in the approximate locations where soil samples with the highest petroleum hydrocarbon concentrations were collected by JEG. Ten soil samples, including one field duplicate, were collected. The analytical results of the soil samples were compared with the CA LUFT cleanup criteria. The results showed nondetectable concentrations of BTEX compounds except toluene (0.041 ppm) in one soil sample. The concentration of TPH as diesel ranged from "not detected" to 6,800 ppm.

Based upon the high concentrations of TPH as diesel in the surface and near-surface soil and the potential for exposure of site workers to these chemicals, OHM excavated the top 18 inches of soil within a potentially petroleum hydrocarbon-affected area approximately 20 by 60 feet. The second round of soil samples following the excavation, showed nondetectable concentrations of BTEX compounds in all the samples. The maximum detected concentration of TPH as diesel was 610 ppm which is significantly below the CA LUFT cleanup level of 10,000 ppm.

Additionally, as presented in Section 5 of CA LUFT Field Manual - General Risk Appraisal was used to evaluate the potential risk posed by the site to groundwater. The results are below the maximum allowable concentrations according to the CA LUFT General Risk Appraisal for TPH as diesel, TPH as gasoline, and BTEX. It is, therefore, not likely that the former IRP Site 15, Unit 1 poses a threat to groundwater quality.

Section 7

Conclusion and Recommendation

Based on the excavation of the petroleum hydrocarbon-affected soil and the analytical results of the final round of soil sampling, the residual petroleum hydrocarbon concentrations at the former IRP Site 15, Unit 1 soil are considered not significant and pose no threat to humans or to groundwater quality. Approximately, 48 tons of soil were excavated and disposed off site.

Additionally, using the CA LUFT Field Manual - General Risk Appraisal, the analytical results obtained in the verification sampling are below the CA LUFT Field Manual maximum allowable levels for TPH as diesel, TPH as gasoline, and BTEX. Thus no potential risk is posed to groundwater.

Since the findings of the verification sampling show no potential for the residual petroleum hydrocarbons at the former IRP Site 15, Unit 1 to impact groundwater, OHM, on behalf of the Station, therefore, recommends requesting closure of the former IRP Site 15, Unit 1 from the CRWQCB, Santa Ana Region.

Section 8

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Appendix A
Memorandum of Transfer of Former IRP
Site 15, Unit 1 to the "Petroleum Corrective
Action Program"

Petroleum Exclusion

Based on the petroleum exclusion under CERCLA, the units listed below are excluded from the installation and Restoration Program. They will be addressed as petroleum release sites with the California Regional Water Quality Control Board as the lead regulatory agency.

Site 15 Suspended Fuel Tanks

Unit 1: Stained Areas


Site 19 ACER Site

Unit 1: Northeast Stained Area

The undersigned agree with the above statement:

 10/25/95
Bonnie Arthur

U.S. Environmental Protection Agency Region IX

 10/25/95
Joseph Joyce

BRAC Environmental Coordinator


Juan Jimenez

California EPA, Dept. of Toxic Substances Control


Larry Vitale

California Regional Water Quality
Control Board

Appendix B
Analytical Results from Previous
Investigation

Table B15-2

Site15 (OU-3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCA3 El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	15_DBS S1454264 (0)	DVF(a)	15_GN1 S1454267 (0)	DVF(a)	15_GN1 S1454269 (2)	DVF(a)	15_GN2 S1454274 (0)	DVF(a)	15_GN2 S1454276 (2)	DVF(a)	15_GN2 S1454501 (2)	DVF(a)	15_GN3 S1454279 (0)	DVF(a)	15_GN3 S1454281 (2)	DVF(a)
METALS																	
SILVER	MG/KG	0.79	b	0.45	U	0.45	U	0.43	U	0.47	U	0.47	U	0.45	U	0.47	U
ALUMINUM	MG/KG	5720		6230		5620		4870		13400		10800		9160		18300	
ARSENIC	MG/KG	2.9		2.5		1.4	b	3.5		2.7		3.4		2.9		2.6	
BARIUM	MG/KG	94.4		83		80.9		51		153		142		119		146	
BERYLLIUM	MG/KG	0.3	b	0.29	b	0.3	b	0.15	b	0.46	b	0.28	b	0.21	b	0.58	b
CALCIUM	MG/KG	4790		4390		2840		4330		8650		8880		4700		7810	
CADMIUM	MG/KG	1	b	1	b	0.53	b	0.84	b	0.99	b	0.9	b	1.6		1.2	
COBALT	MG/KG	3.3	b	3.2	b	2.5	b	4.1	b	7.5	b	5.8	b	4.8	b	7.7	b
CHROMIUM	MG/KG	30.9		13		5.6		8.5		12.2		10.9		28.1		14.8	
COPPER	MG/KG	13.8		15		4.6	b	7.5		10.3		8.4		9.6		9.1	
IRON	MG/KG	9940		10600		8300		9000		17900		15000		13200		20200	
MERCURY	MG/KG	0.03	U	0.07	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	2890		2550		3010		1220		5020		4680		3100		5350	
MAGNESIUM	MG/KG	3590		3430		3430		2200		7820		6430		4390		8690	
MANGANESE	MG/KG	169		168		165		122		288		260		194		298	
SODIUM	MG/KG	258	b	231	b	184	b	226	b	282	b	269	b	292	b	455	b
NICKEL	MG/KG	15		10.5		4.7	b	10.9		6.7	b	6.8	b	9.8		6.6	b
LEAD	MG/KG	30.4		18.3		1.5		6.9		3.3		12.7		34.5		9.6	
SELENIUM	MG/KG	0.19	b	0.25	b	0.11	U	0.11	U	0.2	U	0.2	U	0.17	U	0.18	U
THALLIUM	MG/KG	0.15	U	0.15	U	0.17	U	0.14	U	0.32	b	0.33	b	0.15	b	0.31	b
VANADIUM	MG/KG	24		25.4		19.3		25.3		41.7		35.2		29.8		46.7	
ZINC	MG/KG	61.5		68.2		30.4		31.4		71.1		51.8		57.5		56.9	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	3	J	3	J	11	U	10	U	11	U	10	U	2	J	4	J
ACETONE	UG/KG	87		55		59		18		11	U	5	J	19		11	U
METHYLENE CHLORIDE	UG/KG	58	B	52	B	45	B	37	U	1	U	10	U	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	21000	UJ	710	U	720	U	670	U	740	U	370	J	750	U	740	U
CHRYSENE	UG/KG	21000	UJ	710	U	720	U	670	U	740	U	670	U	750	U	740	U
PHENANTHRENE	UG/KG	5300	J	710	U	720	U	670	U	740	U	670	U	750	U	740	U
BENZYL BUTYL PHTHALATE	UG/KG	21000	UJ	710	U	720	U	670	U	740	U	1200		750	U	740	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	8530		58		13.5	U	17.7	J	22.9	J	12.8	UJ	2780	J	48.3	J
TFH GASOLINE	MG/KG	21.1		0.122		0.129		0.05	U	0.056	U	0.051	U	0.99		0.124	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	23034		1233		74		555		20	U	20	U	2694		229	

Appendix C
Geophysical Survey Report

December 29, 1995

Mr. Dhananjay Dave
OHM Remediation Services Corporation
2031 Main Street
Irvine, Ca 92714

Subject: Field Documentation Report
Utility Location and Pit Delineation Survey
Former UST Sites, MCAS, El Torro

Reference: Job No. 17486
PO No. 1016272

Gentlemen:

A representative of ULS Services Company was present at the referenced sites on and between the dates December 5 through December 18, 1995 to perform underground utility location/clearance surveys and former tank pit delineation work at 18 former UST or IRP sites (**GS-1 through GS-18**) designated by a OHM representative in the field. OHM field staff determined the location of former UST(s)/Pit locations based on location maps. Pit locations were marked in the field by OHM staff. An approximate 100 by 100 square foot survey zone around the reported pit location was surveyed for the presence of utilities and detectable potential interferences at each site. Pit delineation work was performed at and around the reported location chosen by OHM.

METHODS

Utility Detection Survey

Analog Electromagnetic methods were used and include: Electromagnetic Pipe and Cable Location (EMPCL) and Electromagnetic Induction Metal Detection (EMIMD). Conductive Utility Clearance Work was accomplished utilizing EMPCL methods which include passive, ground induction, and connection modes. A high watt signal generator with multi-frequency receiver was used. In addition, EMIMD air to ground induction mode was employed to detect broad metal mass anomalies that may be reflective of potential USTs not reported or known to exist. A bar suspended transmitter and receiver type unit was utilized. Observed EM line signals (utilities) and metal mass anomalies were painted on the ground surface and field drawings were prepared for OHM personnel as well as CAD drawing enclosed with this report (**Figures 1 through 18**).

METHODS (continued)

Pit Delineation Work

Ground Penetrating Radar (GPR) and Electromagnetic Induction Metal Detection (EMIMD) methods were employed. EMIMD was utilized at each site to determine the presence of relative high conductive anomalies in the soil materials, resulting from metallic tank residue which may include rust particles, metal shaving, soil staining, or other potential metal debris left from the tanks and associated piping. These materials when present within surrounding less conductive soil materials may be detectable. GPR transects were run over EMIMD anomalies observed and over reported pit locations where EMIMD anomalies were not observed. GPR data resolution is highly dependent upon soil material conductivity. Generally silty clayey type soil which is relatively high in conductivity lends itself to very poor to no data resolution; whereas silty to sandy or gravelly soils have good data resolution.

FINDINGS

Site GS-1 UST 364-B

Site GS-1 Survey Zone is a topographically flat area near the southwest corner Building 364 (**Figure 1**). Ground surface consists of low cut grass. There is no depression or soil staining on the surface present. There are no other physical UST related features such as vent pipe risers, etc present. Utilities are observed trending through the survey zone and include a natural gas pipe, steam pipes, and a unknown utility (**Figure 1**). OHM field representative requested that pit delineation work be postponed at this site.

Site GS-2 USTs 78 and 80

Site GS-2 Survey Zone is a topographically flat area east of Building 276 (**Figure 2**). Ground surface consists of sparse low cut grass and weeds. Numerous rodent borough activity is present at the surface. Soil appears to be of a silty clayey type. There are some depressions. There are no soil staining on the surface present other than the sparse grassy areas. There are no other physical UST related features such as vent pipe risers, etc present.

There are no utilities observed trending through the survey zone other than a sewer pipe that trends north-south through the zone as observed from sewer manhole inspection and alignment. A small metal mass anomaly approximately one by 17 feet long is observed in the southwest corner of the survey zone near reported pit UST 78.



ULS SERVICES COMPANY

SPECIALIZED SERVICES FOR ENVIRONMENTAL AND CONSTRUCTION ENGINEERING

PAGES 3 THROUGH 10

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SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

GS-17 IRP SITE 15-1 AST 15

Site GS-17 Survey Zone is a topographically flat open area enclosed compound area in the vicinity of the southwest corner of Building 29(**Figure 17**). Ground surface consists of light brown to dark tan silty clay -clayey silt material. A sewer manhole is located near the east side of the survey zone. Piping trends north-south as observed from manhole inspection. GPR and EMIMD metallic residue surveys were not performed at this site since it is reported as a Above Ground Storage (AST) tank site.

GS-18 IRP SITE 19

Site GS-18 Survey Zone is a topographically flat area located between a drainage culvert that drains towards the southwest and a concrete pavement area. This site is located next to a Jet Fuel remote fill area(**Figure 18**). Ground surface consists of soil materials. Fiberglass fuel piping is reported to trend southwest-northeast along the top of the culvert bank. Electric and water may also trend in this same direction. A stormdrain also trends east to west across the survey zone. sewer manhole is located near the east side of the survey zone. GPR and EMIMD metallic residue surveys were not performed at this site since it is not reported as a UST pit site.



FIGURES 1 THROUGH 16

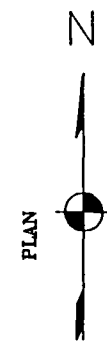
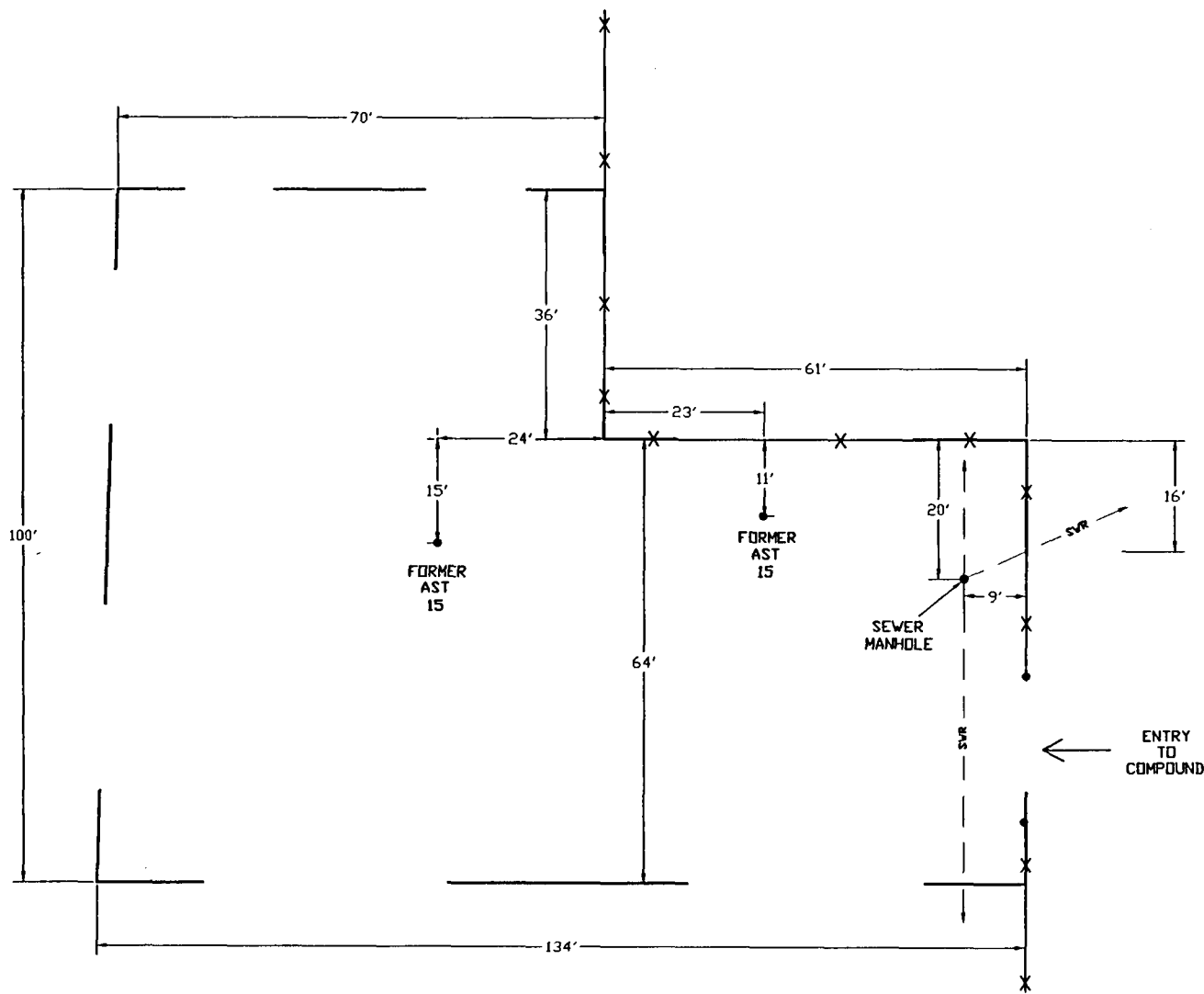
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E-MAIL: diane.silva@navy.mil



PROPORTIONAL
NOT TO SCALE
DIMENSIONS SHOWN ARE APPROXIMATE

EXPLANATION

- AST's & ABOVE GROUND STRUCTURES & BLDGS.
- ABOVE GROUND PIPING AND UTILITIES
- [] ULS SURVEY ZONE
- X-X- FENCE
- UNDER GROUND PIPING AND UTILITIES
- ANOMALIES AND UNDER GROUND STRUCTURES :
- [X] STRONG
- [] WEAK
- EDGE OF GROUND, CURB, OR ASPHALT AND CONCRETE PAVEMENT

OHM REMEDIATION SERVICES CORP.			
ULS SERVICES CO.		MCAS EL TORRO	
DRAWN BY: JW		UTILITY LOCATION SURVEY FORMER IRP 15.1	
CAD BY: MM			
CHECKED BY: MB			
DATE: 12-16-05		PROJECT NO. 17486 PO NO. 1016272	FIG. 17 NO. 17

FIGURE 18

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E-MAIL: diane.silva@navy.mil

Appendix D
Site Photographs



Soil Excavation in Progress



Top 18 inches of Soil Excavated



Excavated Soil Stockpile



Backfilling with Nonimpacted Road Base-Type Soil

Appendix E
Curtis and Tompkins Analytical Results



OHM Remediation Services Corp.

12425

CHAIN-OF-CUSTODY RECORD

LAB COPY

Form 0019

Field Technical Services

Rev. 08/89

173837

O.H. MATERIALS CORP.

P.O. BOX 551

FINDLAY, OH 45839-0551

419-423-3526

PROJECT NAME		PROJECT LOCATION		ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS)				
PROJECT NO.		PROJECT TELEPHONE NO.						
17486		DITANAWAJAY DALL		(714)263-1147				
CLIENT'S REPRESENTATIVE		PROJECT MANAGER/SUPERVISOR		REMARKS				
BHM		Bill Sedlak						
ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	
1	96-IRP13-ER-257	1/29/96	11:45		✓	EQUIPMENT RINSEATE FROM IRP 15	3	
2	96-TB-W-258	1/27/96	08:00		✓	TRIP BLANK	1	
3								
4								
5								
6								
7								
8								
9								
10								
TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY		TRANSFERS ACCEPTED BY		DATE	TIME	REMARKS
1	1 to 2	Bahar Bekth		Scott Castro		1/29/96	15:30	5 DAY TAT
2								
3								
4				Jesse Williams		1/30/96	10	Bahar Bekth SAMPLER'S SIGNATURE



OHM Remediation
Services Corp.

124626

CHAIN-OF-CUSTODY RECORD

LAB CO

Form 01
Field Technical Servi
Rev. 08

173689

O.H. MATERIALS CORP. • P.O. BOX 551 • FINDLAY, OH 45839-0551 • 419-423-3526

PROJECT NAME		PROJECT LOCATION		NUMBER OF CONTAINERS		ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS)										REMARKS
PROJ. NO.	PROJECT CONTACT	PROJECT TELEPHONE NO.														
CLIENT'S REPRESENTATIVE	PROJECT MANAGER/SUPERVISOR															
IRP15.1 SOIL REMOVAL		EL TORO, MCAS				8015 FULL RANGE 8020 3 DAY TAT										
17486		GERALD TAMASHIRO		(714) 263-1146 x739												
LYNN HORNECKER-SWDI		BILL SEDAK-OHM														
ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)										
1	96-0229 -W-TB	2/29/96	0900		X	TRIP BLANK FOR 2-29-96										1
2	96-IRP15 -S-269		1105		X	SOIL SAMPLE AT IRP15 0.5 FT										1
3	96-IRP15 -S-270		1135		X	SOIL SAMPLE @ IRP15 0.5 FT										1
4	96-IRP15 -S-271		1150		X	SOIL SAMPLE @ IRP15 0.5 FT										1
5	96-IRP15 -S-272		1200		X	SOIL SAMPLE @ IRP15 0.5 FT										1
6	96-IRP15 -S-273		1210		X	SOIL SAMPLE @ IRP15 0.5 FT										1
7	96-IRP15 -S-274	2/29/96	1220		X	SOIL SAMPLE FROM IRP15 STOCKPILE 0.5 FT										1
8																
9																
10																

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME	REMARKS
1	1 TO 7	Gerald Tamashiro	Dan Allbe	2/29/96	1425	CURTIS & TOMPKINS BECKLEY
2						
3						
4						

SAMPLER'S SIGNATURE: Gerald Tamashiro



TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-001	96-IRP15-SB01-S-248	25700	01/29/96	02/01/96	02/05/96	12%
124235-002	96-IRP15-SB02-S-249	25700	01/29/96	02/01/96	02/03/96	8%
124235-003	96-IRP15-SB03-S-250	25700	01/29/96	02/01/96	02/03/96	6%
124235-004	96-IRP15-SB04-S-251	25700	01/29/96	02/01/96	02/05/96	8%

Matrix: Soil

Analyte	Units	124235-001	124235-002	124235-003	124235-004
Diln Fac:		1	1	1	2
JP5	mg/Kg	<11	<11	<11	2200 YH
Diesel C12-C22	mg/Kg	<11	<11	<11	6900
Hydraulic Fluid	mg/Kg	440 YH	930 YH	<270	7900 YHL
Motor Oil C22-C50	mg/Kg	510 YH	1200 YH	<270	4200 YH
Surrogate					
Hexacosane	%REC	95	95	94	100

Y: Sample exhibits fuel pattern which does not resemble standard

H: Heavier hydrocarbons than indicated standard

L: Lighter hydrocarbons than indicated standard



TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-005	96-IRP15-SB05-S-252	25700	01/29/96	02/01/96	02/03/96	1%
124235-006	96-IRP15-SB06-S-253	25700	01/29/96	02/01/96	02/03/96	14%
124235-007	96-IRP15-SB07-S-254	25700	01/29/96	02/01/96	02/03/96	9%
124235-008	96-IRP15-SB08-S-255	25700	01/29/96	02/01/96	02/03/96	11%

Matrix: Soil

Analyte	Units	124235-005	124235-006	124235-007	124235-008
Diln Fac:		1	1	1	1
JP5	mg/Kg	<10	13 YH	<11	<11
Diesel C12-C22	mg/Kg	75 YH	700 YH	100 YH	<11
Hydraulic Fluid	mg/Kg	1900 YH	9300 YH	2400 YH	2100 YH
Motor Oil C22-C50	mg/Kg	2300 YH	11000 YH	3000 YH	2600 YH
Surrogate					
Hexacosane	%REC	69	85	88	90

Y: Sample exhibits fuel pattern which does not resemble standard

H: Heavier hydrocarbons than indicated standard

L: Lighter hydrocarbons than indicated standard

Oil rev. 1



TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-009	96-IRP15-SB05-S-256	25700	01/29/96	02/01/96	02/03/96	6%
124235-012	96-IRP-19-SB01-S-259	25700	01/29/96	02/01/96	02/03/96	6%
124235-013	96-IRP-19-SB02-S-260	25700	01/29/96	02/01/96	02/03/96	7%
124235-014	96-IRP-19-SB03-S-261	25700	01/29/96	02/01/96	02/03/96	6%

Matrix: Soil

Analyte	Units	124235-009	124235-012	124235-013	124235-014
Diln Fac:		1	1	1	1
JP5	mg/Kg	46 YH	<11	48 Y	<11
Diesel C12-C22	mg/Kg	980 YH	<11	<11	<11
Hydraulic Fluid	mg/Kg	3200 Y	<270	<270	<270
Motor Oil C22-C50	mg/Kg	3300 YHL	<270	<270	<270
Surrogate					
Hexacosane	%REC	93	93	98	93

Y: Sample exhibits fuel pattern which does not resemble standard

H: Heavier hydrocarbons than indicated standard

L: Lighter hydrocarbons than indicated standard

012



TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-010	96-IRP15-ER-257	25709	01/29/96	02/01/96	02/05/96	
124235-018	96-IRP19-ER-265	25709	01/29/96	02/01/96	02/05/96	

Matrix: Water

Analyte	Units	124235-010	124235-018
Diln Fac:		1	1
JP5	ug/L	<50	<50
Diesel C12-C22	ug/L	<50	<50
Hydraulic Fluid	ug/L	<1300	<1300
Motor Oil C22-C50	ug/L	<1300	<1300
Surrogate			
Hexacosane	%REC	103	106

H: Heavier hydrocarbons than indicated standard

L: Lighter hydrocarbons than indicated standard



TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-002	96-IRP15-S-269	26220	02/29/96	03/01/96	03/07/96	10%
124626-003	96-IRP15-S-270	26220	02/29/96	03/01/96	03/07/96	11%
124626-004	96-IRP15-S-271	26220	02/29/96	03/01/96	03/08/96	9%
124626-005	96-IRP15-S-272	26220	02/29/96	03/01/96	03/08/96	6%

Analyte	Units	124626-002	124626-003	124626-004	124626-005
Diln Fac:		1	1	1	1
JP5 (C10-C16)	mg/Kg	<11	<11	<11	27 YH
Diesel Range	mg/Kg	<11	28	<11	350 YH
Motor Oil Range	mg/Kg	<56	330	130	2100 Y
Surrogate					
Hexacosane	%REC	85	81	80	74

Y: Sample exhibits fuel pattern which does not resemble standard

H: Heavier hydrocarbons than indicated standard

007 rev.1



TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-006	96-IRP15-S-273	26220	02/29/96	03/01/96	03/08/96	10%

Analyte	Units	124626-006
Diln Fac:		1
JP5 (C10-C16)	mg/Kg	<11
Diesel Range	mg/Kg	140 YH
Motor Oil Range	mg/Kg	3000 YH
Surrogate		
Hexacosane	%REC	72

Y: Sample exhibits fuel pattern which does not resemble standard

H: Heavier hydrocarbons than indicated standard

Sample Name : 124235-001,30:30

FileName : g:\gc13\chb\0368008.raw

Method : TEH.ins

Start Time : 0.00 min

Scale Factor: -1

End Time : 31.92 min

Plot Offset: 30 mV

Sample #: 25700

Date : 2/5/96 03:10 PM

Time of Injection: 2/5/96 01:06 PM

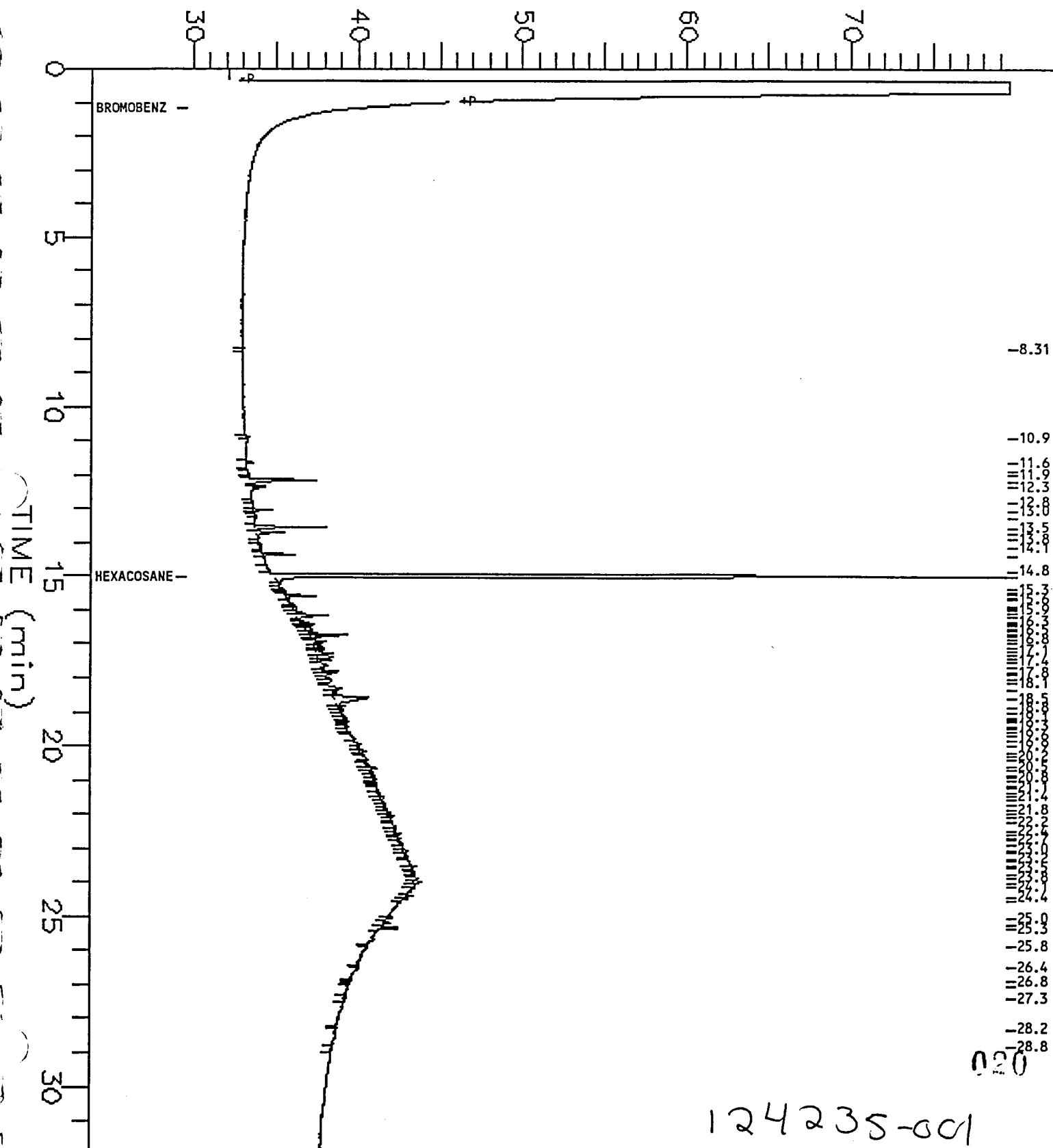
Low Point : 29.61 mV

Plot Scale: 50 mV

Page 1 of 1

High Point : 79.61 mV

RESPONSE (mV)



TEH Chromatogram-GC13 CH B

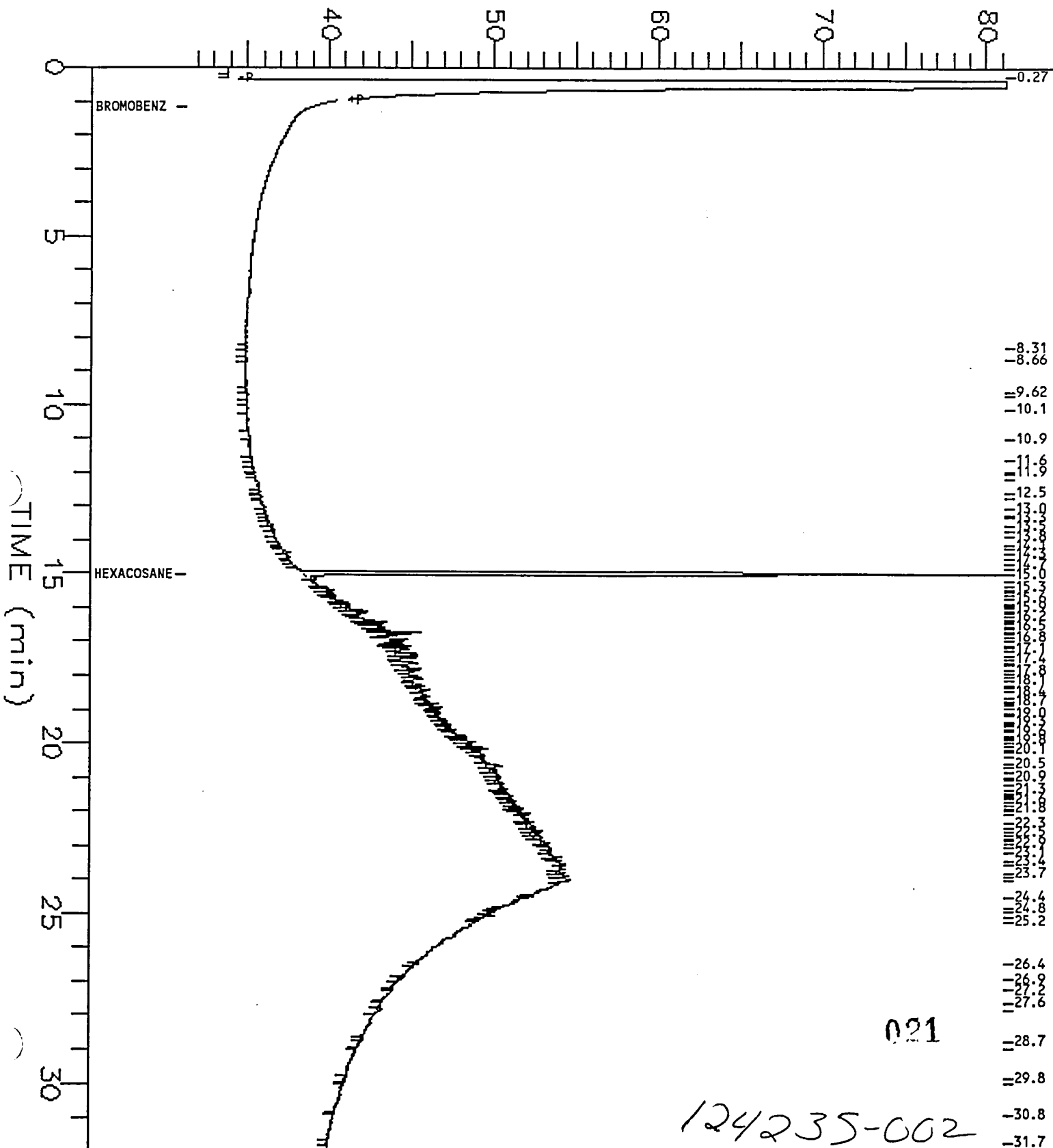
Sample Name : 124235-002,30:30
 FileName : g:\gc13\chb\0338035.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 31 mV

Sample #: 25700
 Date : 2/3/96 01:53 PM
 Time of Injection: 2/3/96 01:18 PM
 Low Point : 31.26 mV
 Plot Scale: 50 mV
 High Point : 81.26 mV

Page 1 of 1

RESPONSE (mV)

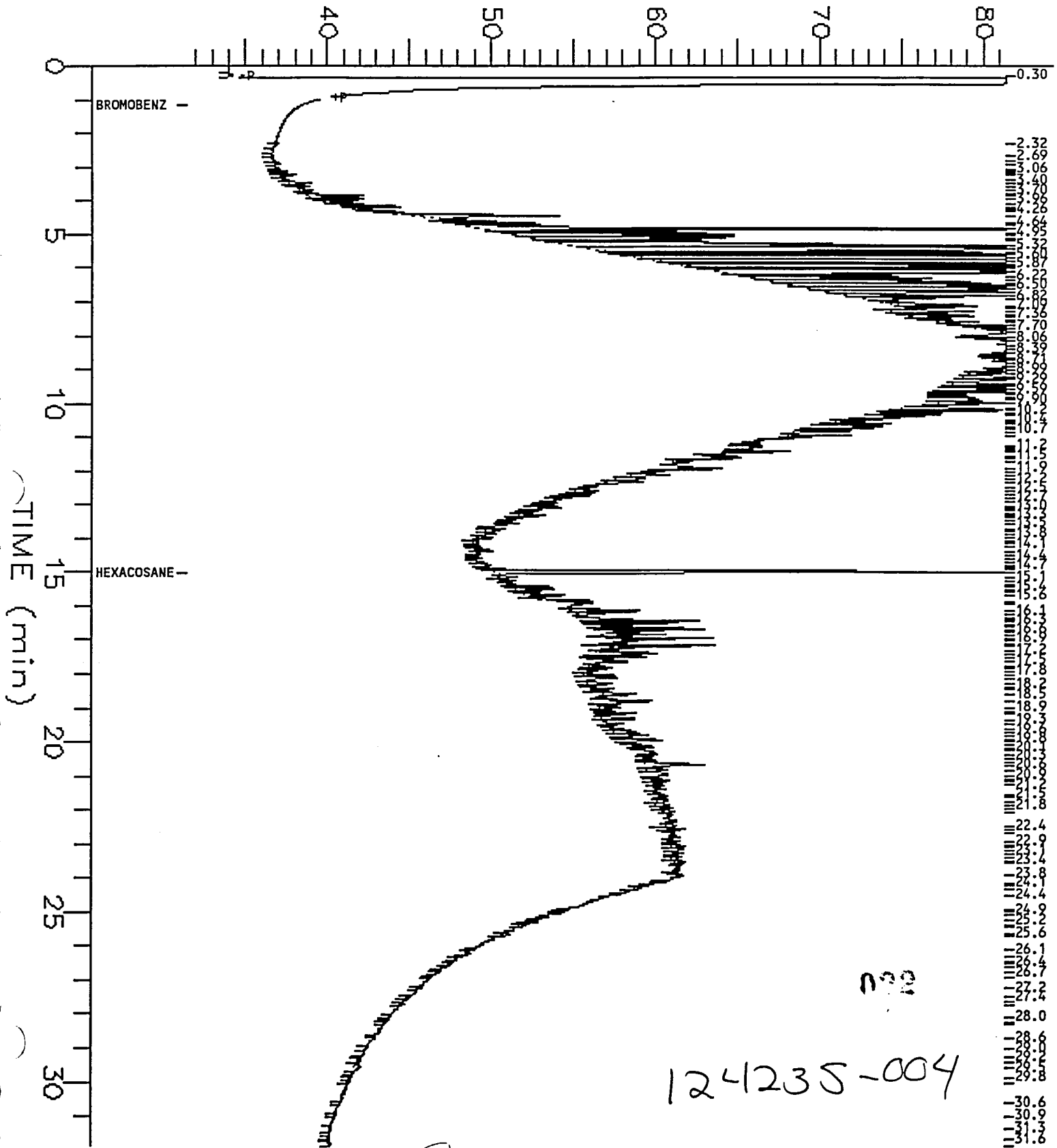


Sample Name : 124235-004,30:60
 FileName : g:\gc13\chb\036B009.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 32 mV

Sample #: 25700
 Date : 2/5/96 03:12 PM
 Time of Injection: 2/5/96 01:49 PM
 Low Point : 31.45 mV
 Plot Scale: 50 mV
 High Point : 81.45 mV

RESPONSE (mV)



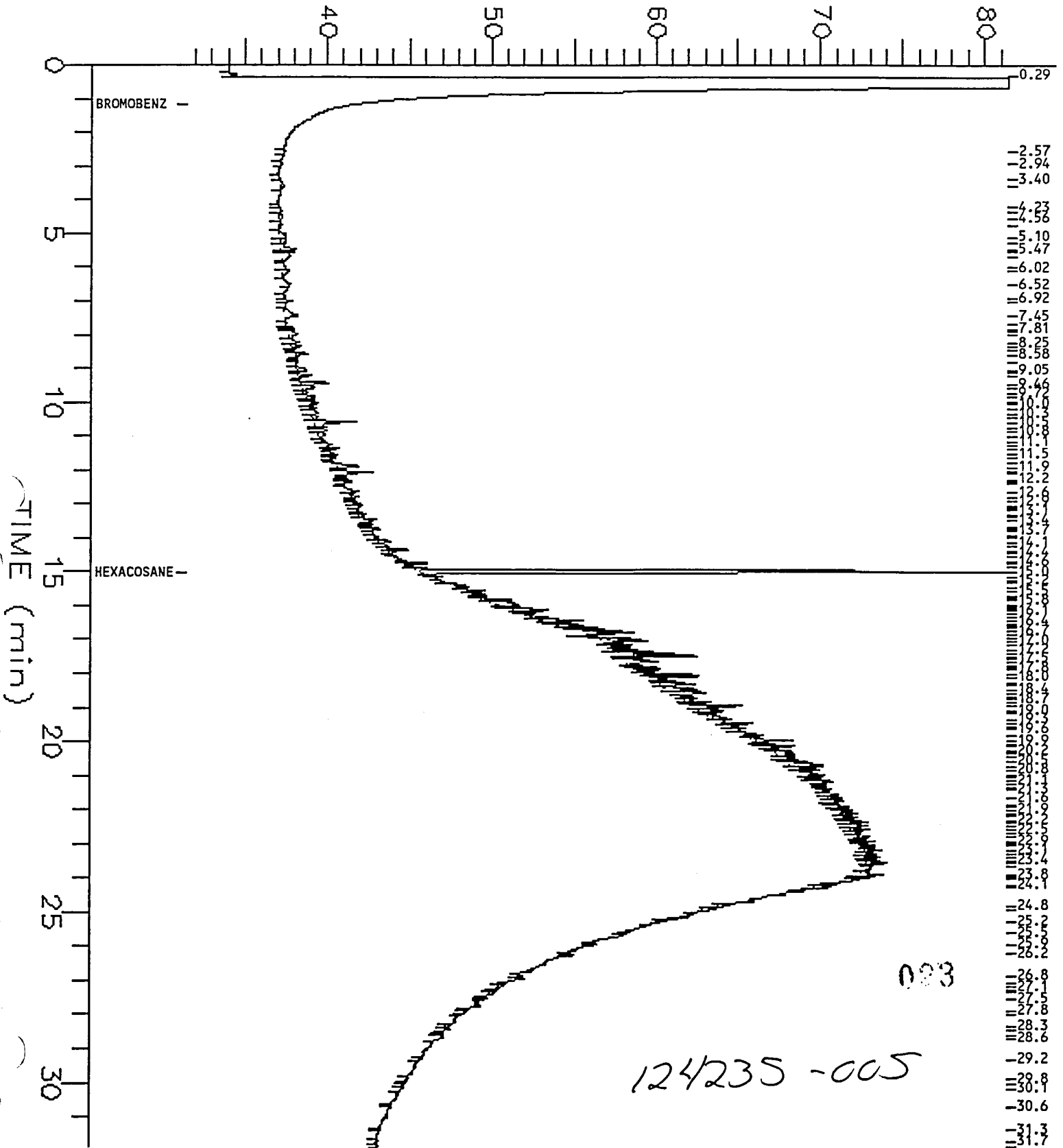
032
 124235-004

Sample Name : 124235-005,30:30
 FileName : g:\gc13\chb\0338039.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 32 mV

Sample #: 25700
 Date : 2/3/96 04:45 PM
 Time of Injection: 2/3/96 04:10 PM
 Low Point : 31.50 mV
 Plot Scale: 50 mV
 High Point : 81.50 mV

RESPONSE (mV)

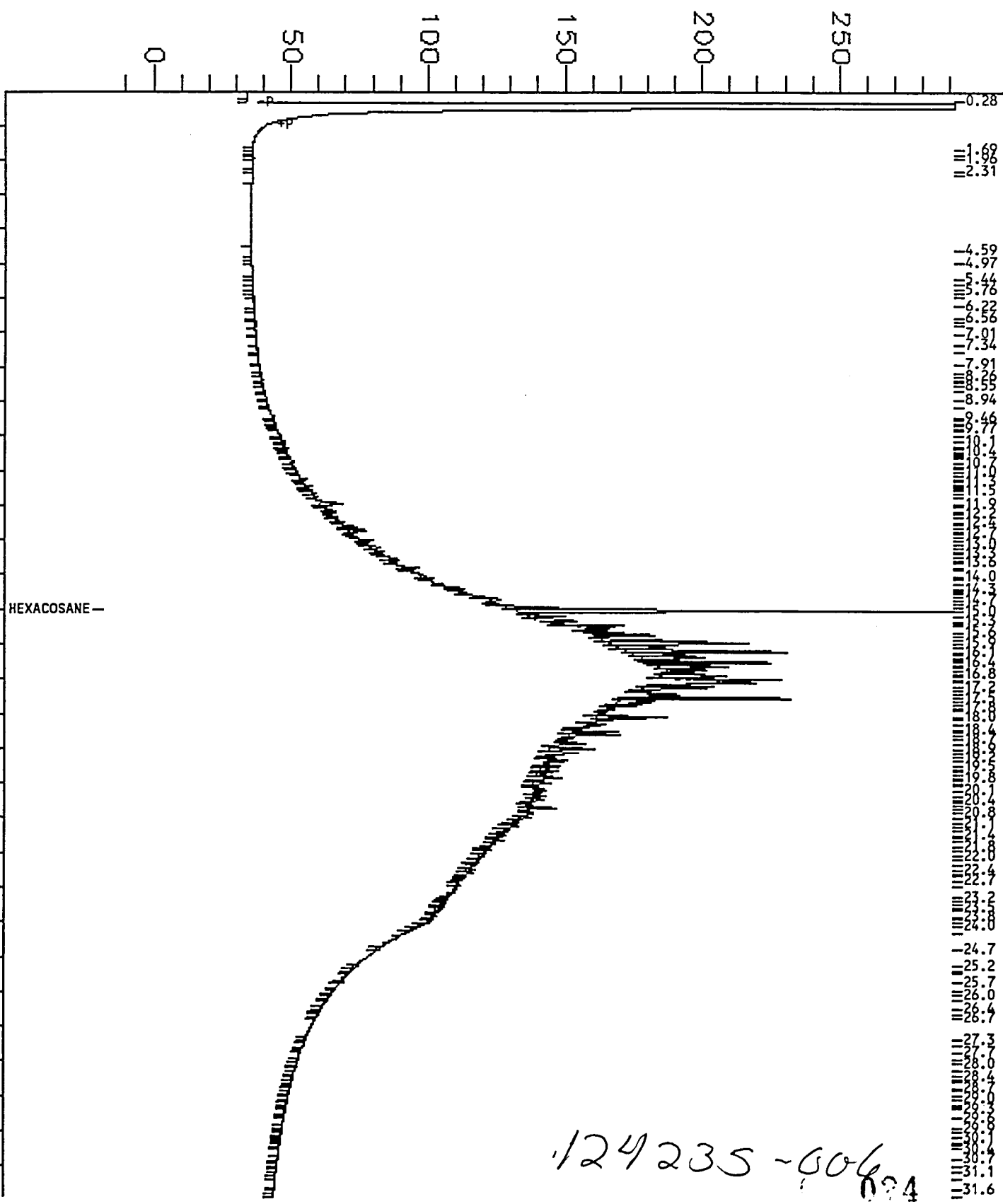


Sample Name : 124235-006,30:30
FileName : G:\GC13\CHB\033B032.raw
Method : TEH.ins
Start Time : 0.01 min
Scale Factor: 0

End Time : 31.92 min
Plot Offset: -18 mV

Sample #: 25700
Date : 2/5/96 08:59 AM
Time of Injection: 2/3/96 11:10 AM
Low Point : -18.11 mV
Plot Scale: 310 mV
High Point : 291.93 mV

RESPONSE (mV)



124235-006 024

TEH Chromatogram-GC13 CH B

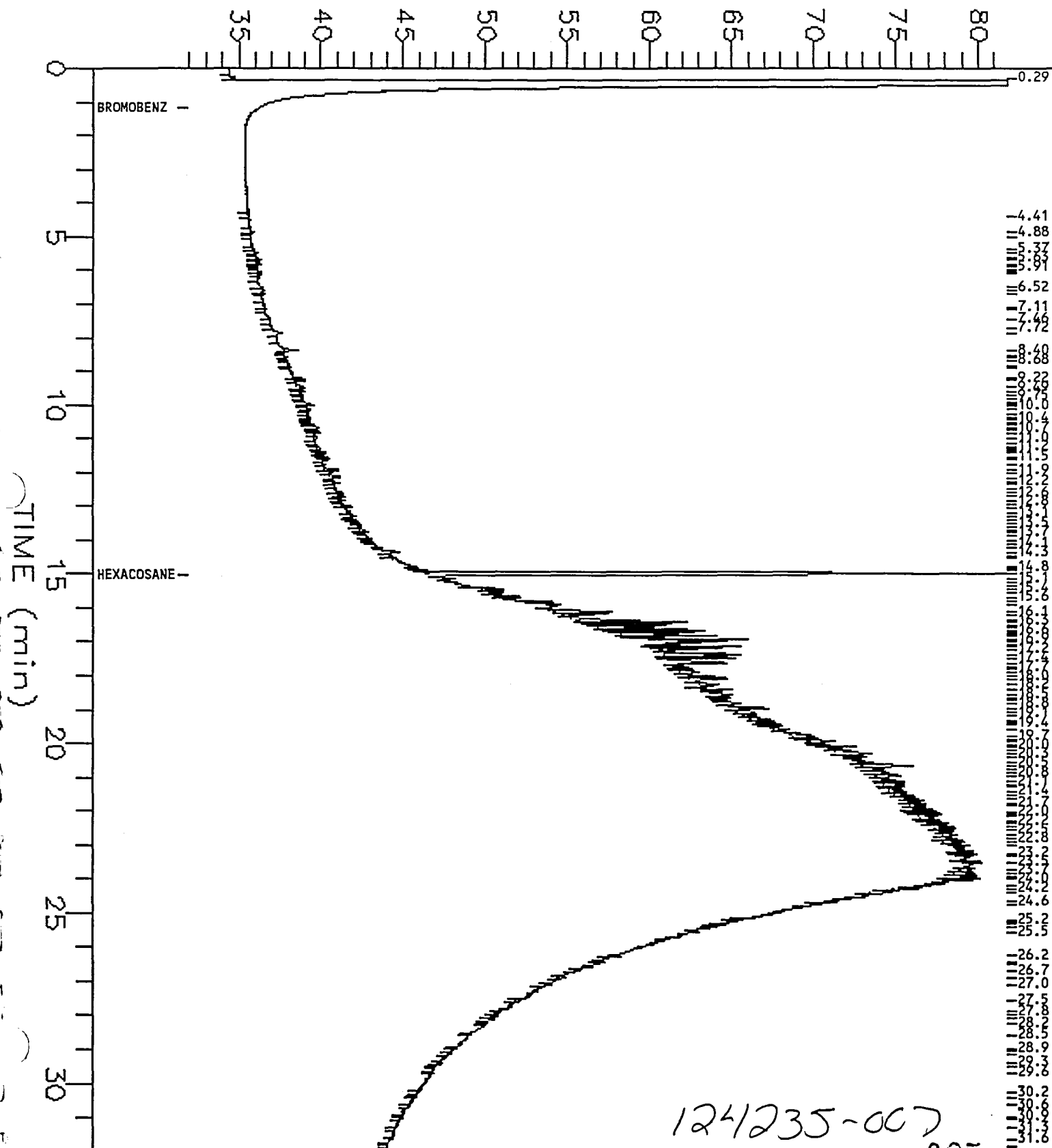
Sample Name : 124235-007,30:30
 FileName : g:\gc13\chb\033B041.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 32 mV

Sample #: 25700
 Date : 2/3/96 06:11 PM
 Time of Injection: 2/3/96 05:36 PM
 Low Point : 31.86 mV
 Plot Scale: 50 mV
 High Point : 81.86 mV

Page 1 of 1

RESPONSE (mV)



1241235-007

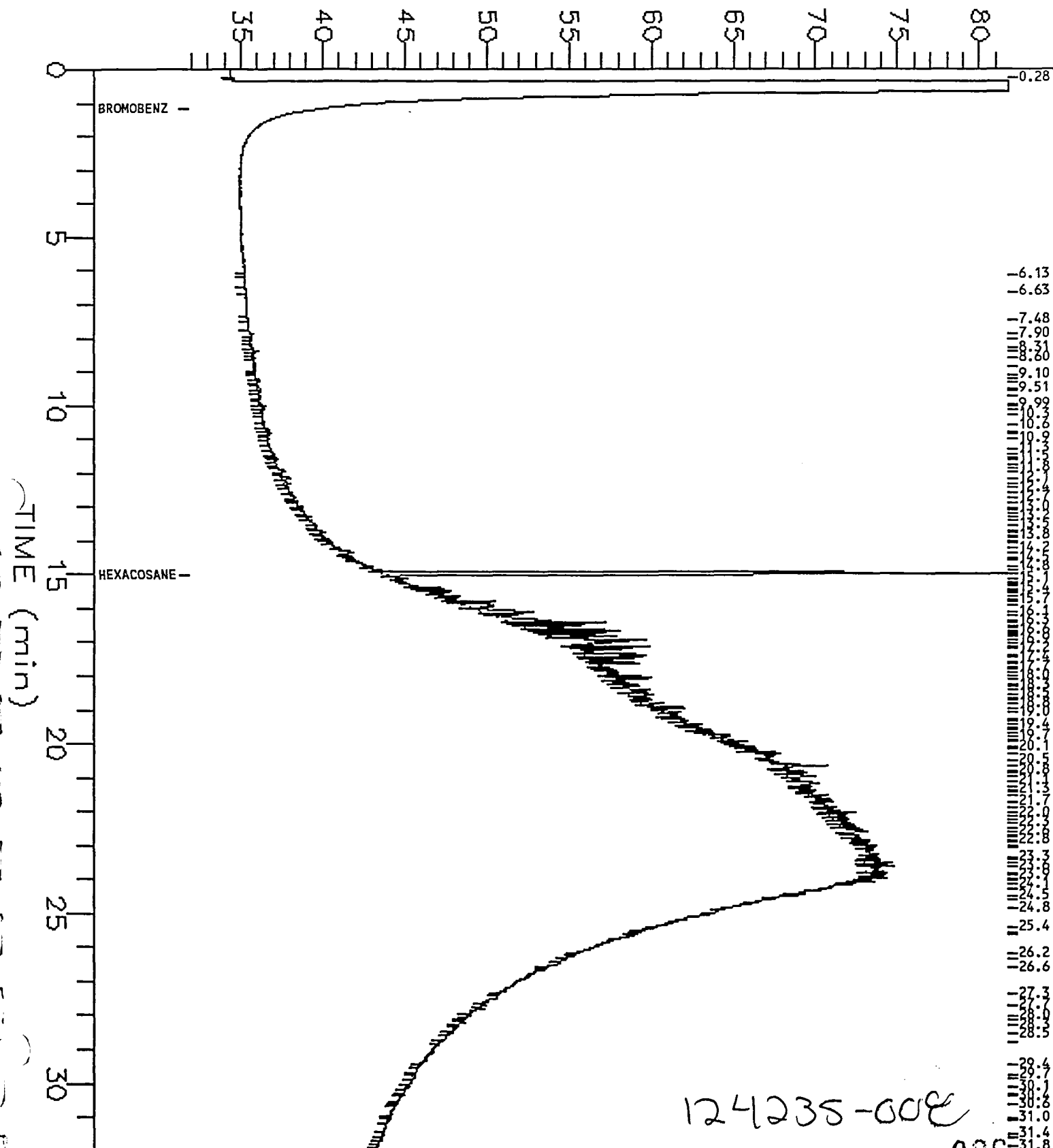
025

Sample Name : 124235-008,30:30
 FileName : g:\gc13\chb\0338043.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 32 mV

Sample #: 25700
 Date : 2/3/96 07:36 PM
 Time of Injection: 2/3/96 07:02 PM
 Low Point : 31.82 mV
 Plot Scale: 50 mV
 High Point : 81.82 mV

RESPONSE (mV)



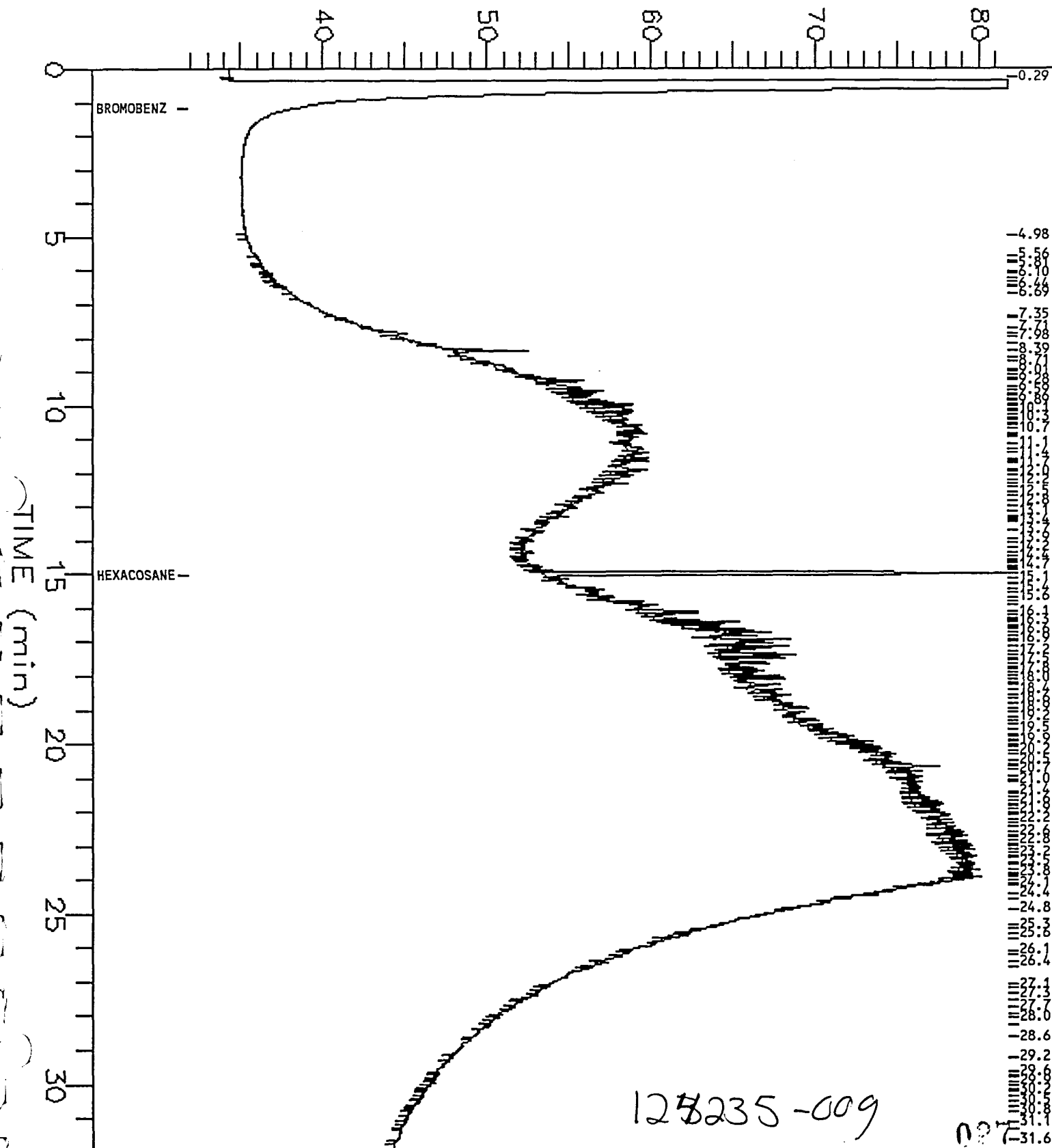
124235-008

Sample Name : 124235-009,30:30
 FileName : g:\gc13\chb\033B045.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor : -1

End Time : 31.92 min
 Plot Offset: 32 mV

Sample #: 25700
 Date : 2/3/96 09:02 PM
 Time of Injection: 2/3/96 08:28 PM
 Low Point : 31.77 mV
 Plot Scale: 50 mV

RESPONSE (mV)



124235-009

007-31.6

GC15 Channel A Surrogate

Sample Name : S,124626-003,26220

FileName : C:\GC15\CHB\067B012.raw

Method : DUAL

Start Time : 0.00 min

Scale Factor: 0.0

End Time : 31.90 min

Plot Offset: 32 mV

Sample #: 26220

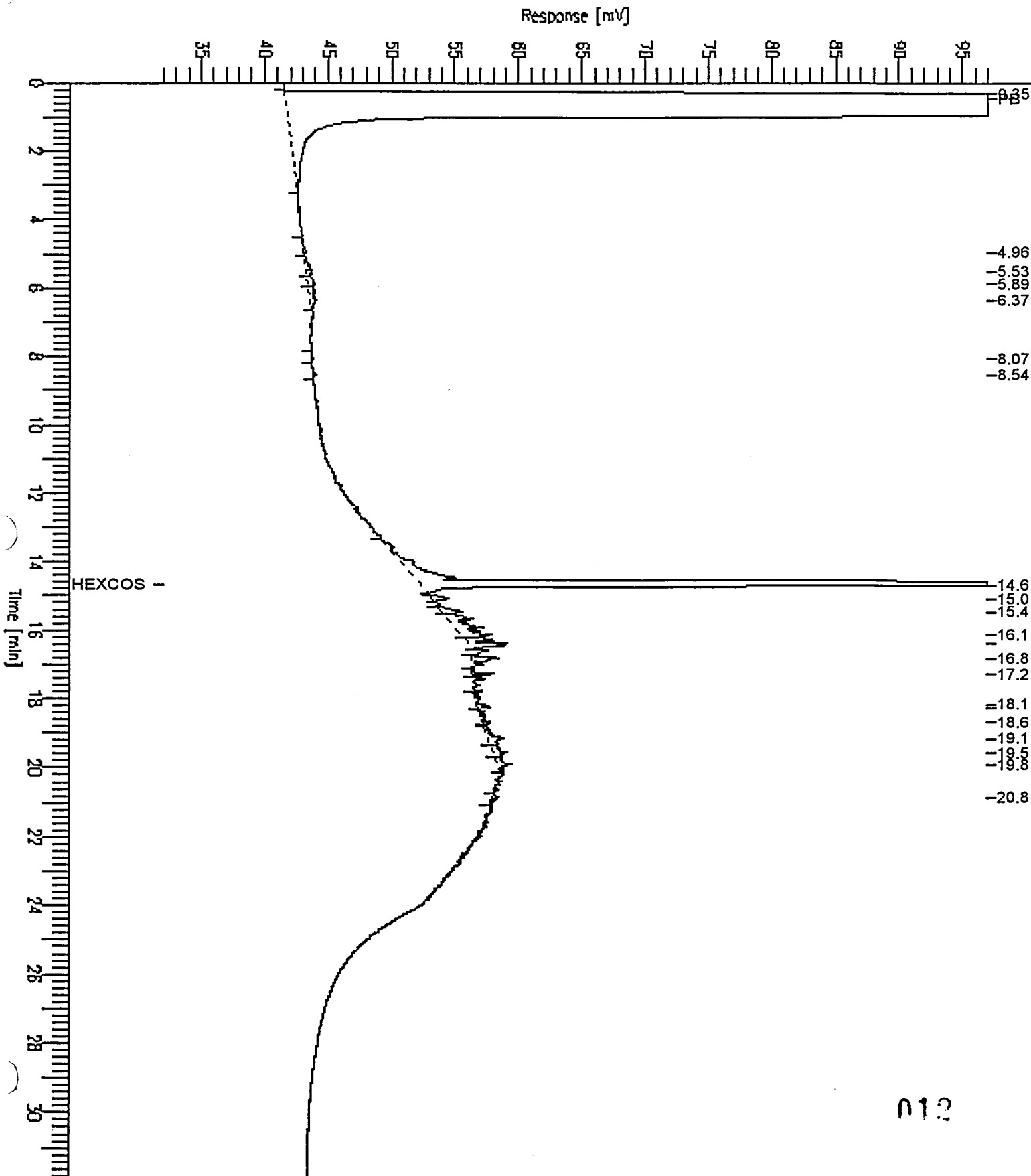
Date : 3/7/96 11:51 PM

Time of Injection: 3/7/96 11:18 PM

Low Point : 32.00 mV

Plot Scale: 65.0 mV

Page 1 of 1



012

GC15 Channel A Surrogate

Sample Name : S,124626-004,26220

FileName : C:\GC15\CHB\067B013.raw

Method : DUAL

Start Time : 0.00 min

End Time : 31.90 min

Scale Factor: 0.0

Plot Offset: 32 mV

Sample #: 26220

Date : 3/8/96 12:34 AM

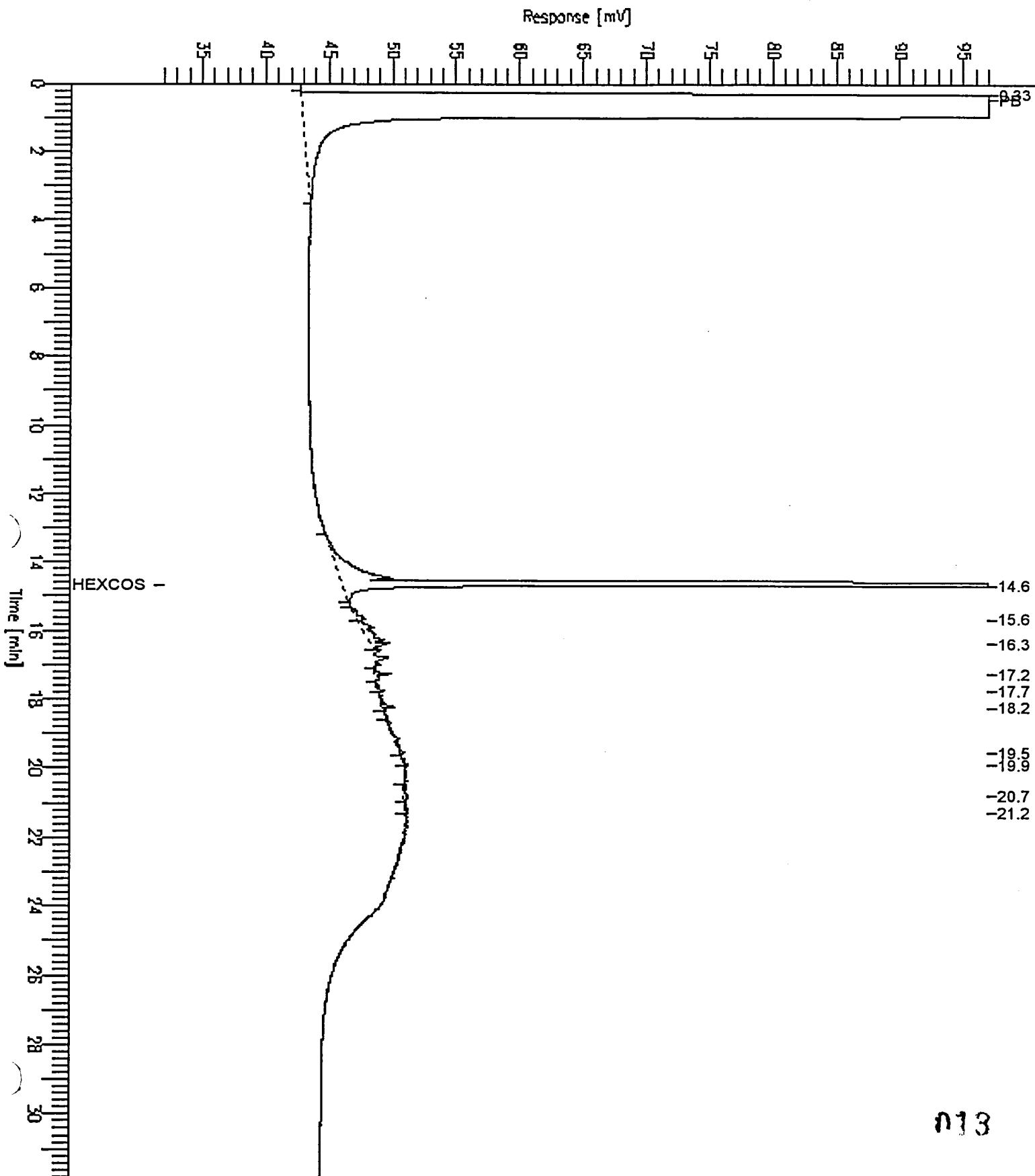
Time of Injection: 3/8/96 12:02 AM

Low Point : 32.00 mV

High Point : 97.00 mV

Plot Scale: 65.0 mV

Page 1 of 1



Sample Name : S,124626-005,26220

FileName : C:\GC15\CHB\067B014.RAW

Method : BTEH.MTH

Start Time : 0.01 min

Scale Factor: 0.0

End Time : 31.91 min

Plot Offset: 39 mV

Sample #: 26220

Date : 3/8/96 10:54 AM

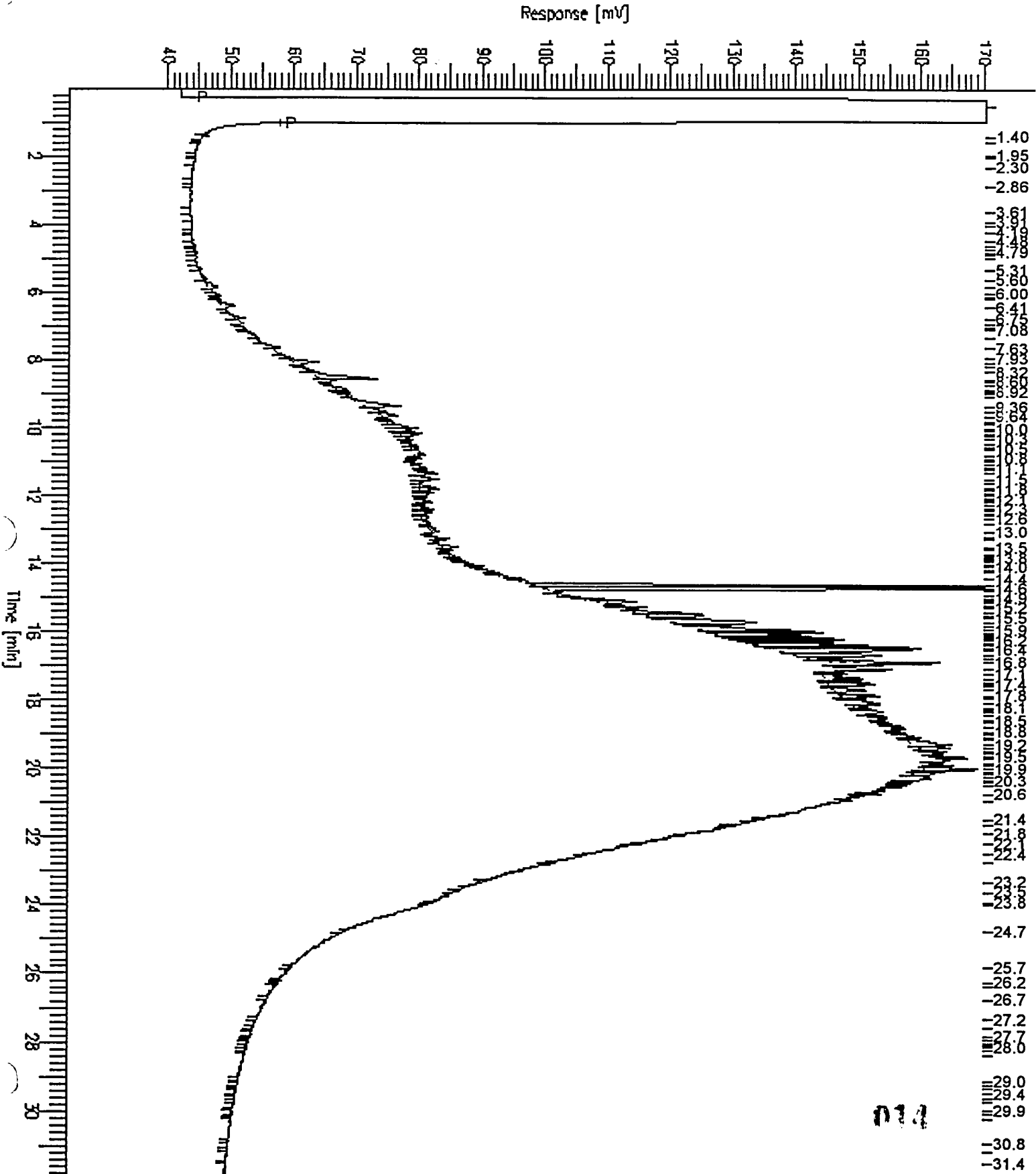
Time of Injection: 3/8/96 12:45 AM

Low Point : 39.09 mV

Plot Scale: 131.3 mV

Page 1 of 1

High Point : 170.41 mV



GC15 Channel A TEH

Sample Name : S,124626-006,26220

FileName : C:\GC15\CHB\067B017.RAW

Method : BTEH.MTH

Start Time : 0.01 min

Scale Factor: 0.0

End Time : 31.91 min

Plot Offset: 44 mV

Sample #: 26220

Date : 3/8/96 10:52 AM

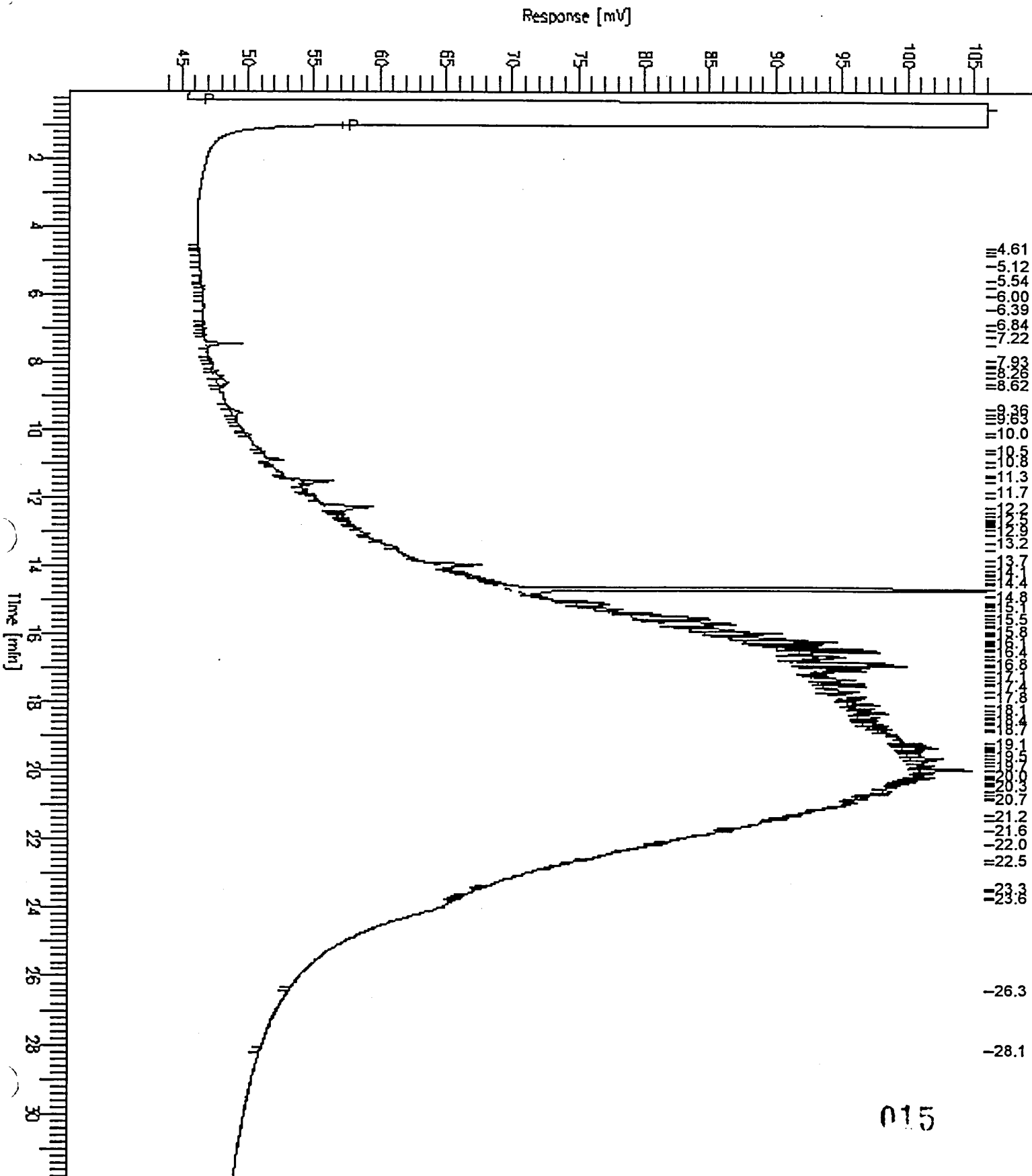
Time of Injection: 3/8/96 02:57 AM

Low Point : 43.61 mV

Plot Scale: 62.4 mV

Page 1 of 1

High Point : 106.06 mV



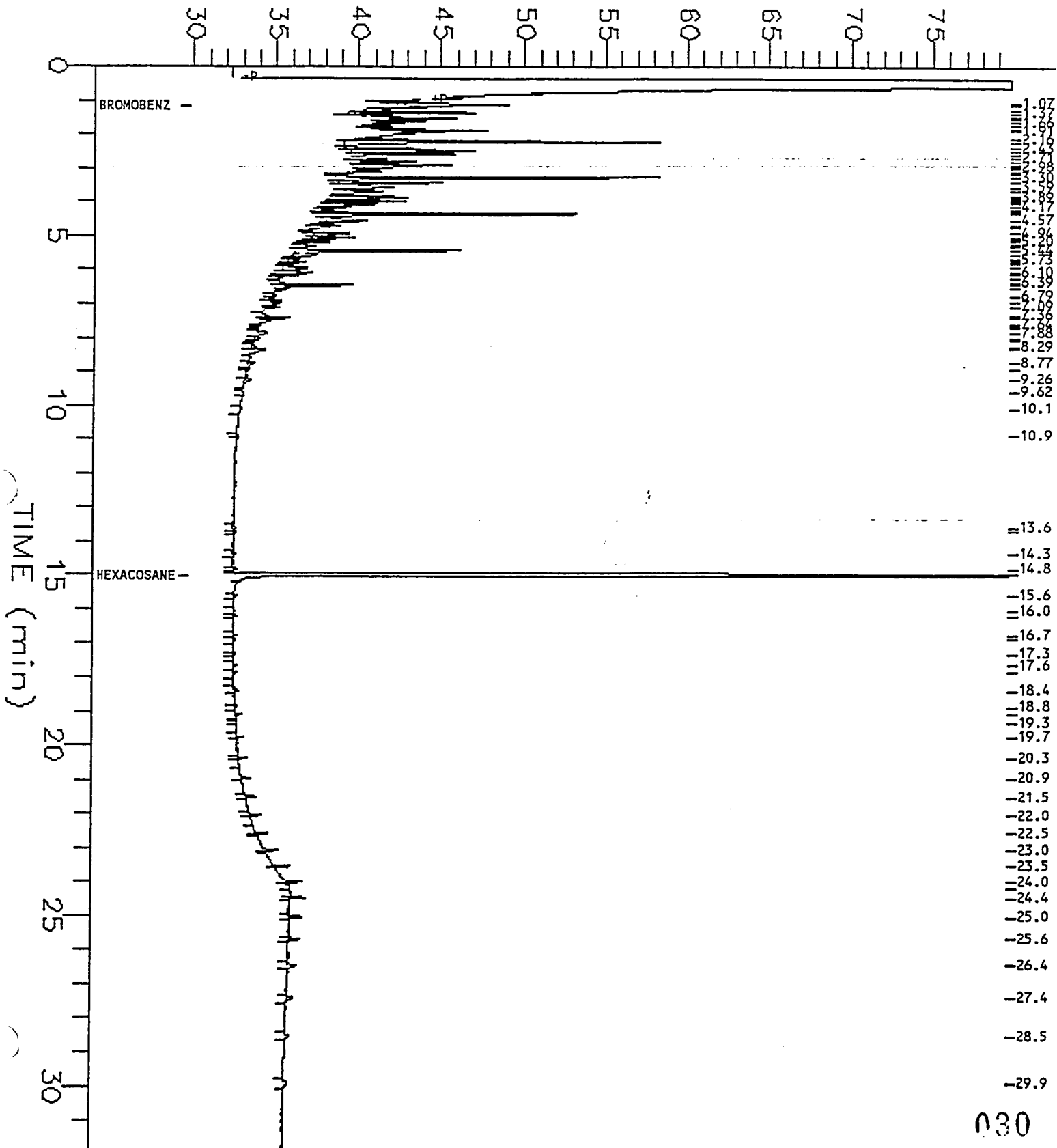
015

Sample Name : JP-5 250MG/L
 FileName : g:\gc13\chb\0368003.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 30 mV

Sample #: 95WS0751
 Date : 2/5/96 10:06 AM
 Time of Injection: 2/5/96 09:33 AM
 Low Point : 29.75 mV
 Plot Scale: 50 mV
 High Point : 79.75 mV

RESPONSE (mV)



GC15 Channel A TEH

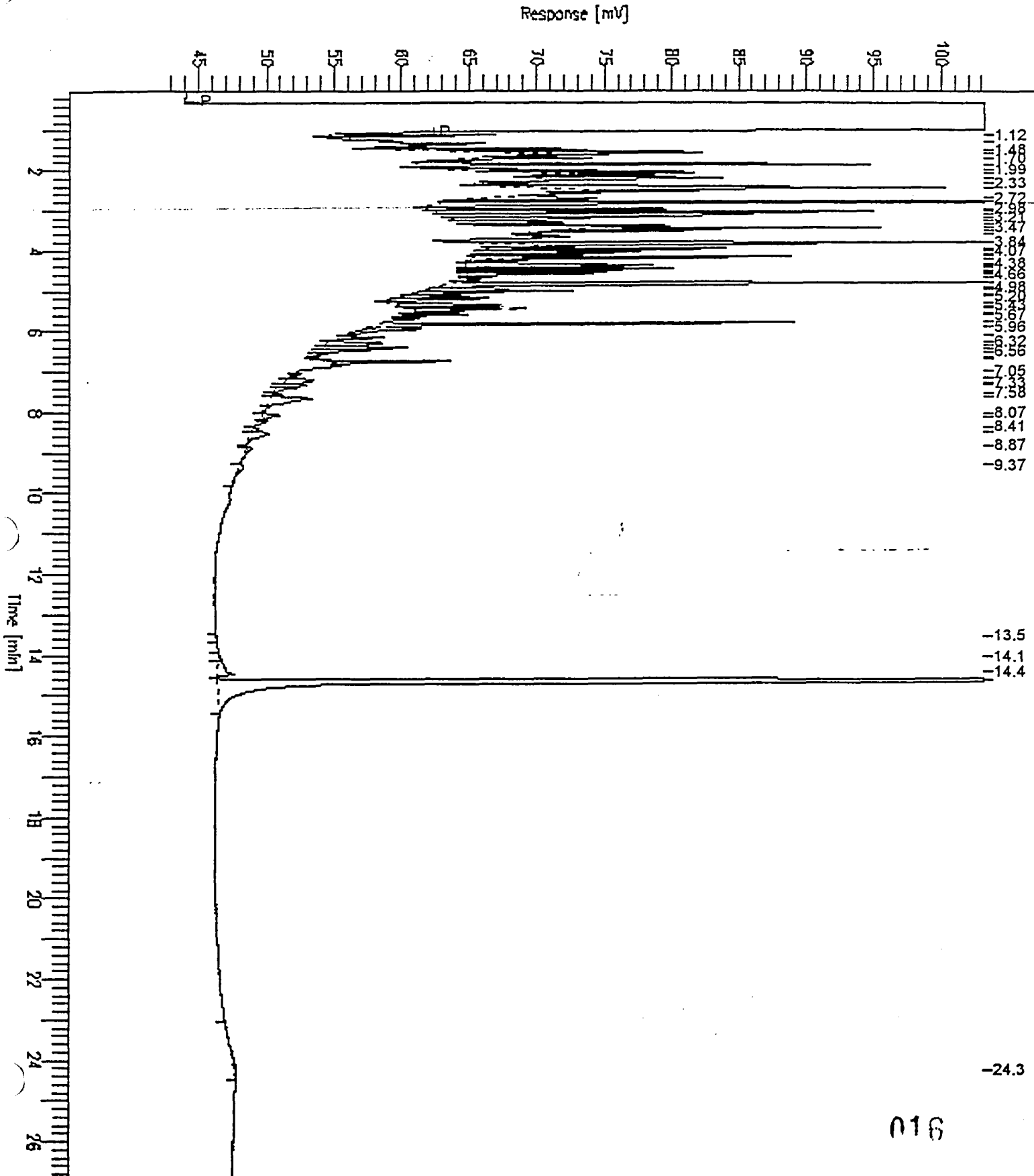
JP-5

Sample Name : CCV,JP5
FileName : C:\GC15\CHB\067B023.RAW
Method : BTEH.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 26.87 min
Plot Offset: 42 mV

Sample #: 250MG/L
Date : 3/8/96 01:50 PM
Time of Injection: 3/8/96 07:20 AM
Low Point : 42.42 mV
Plot Scale: 60.8 mV

Page 1 of 1



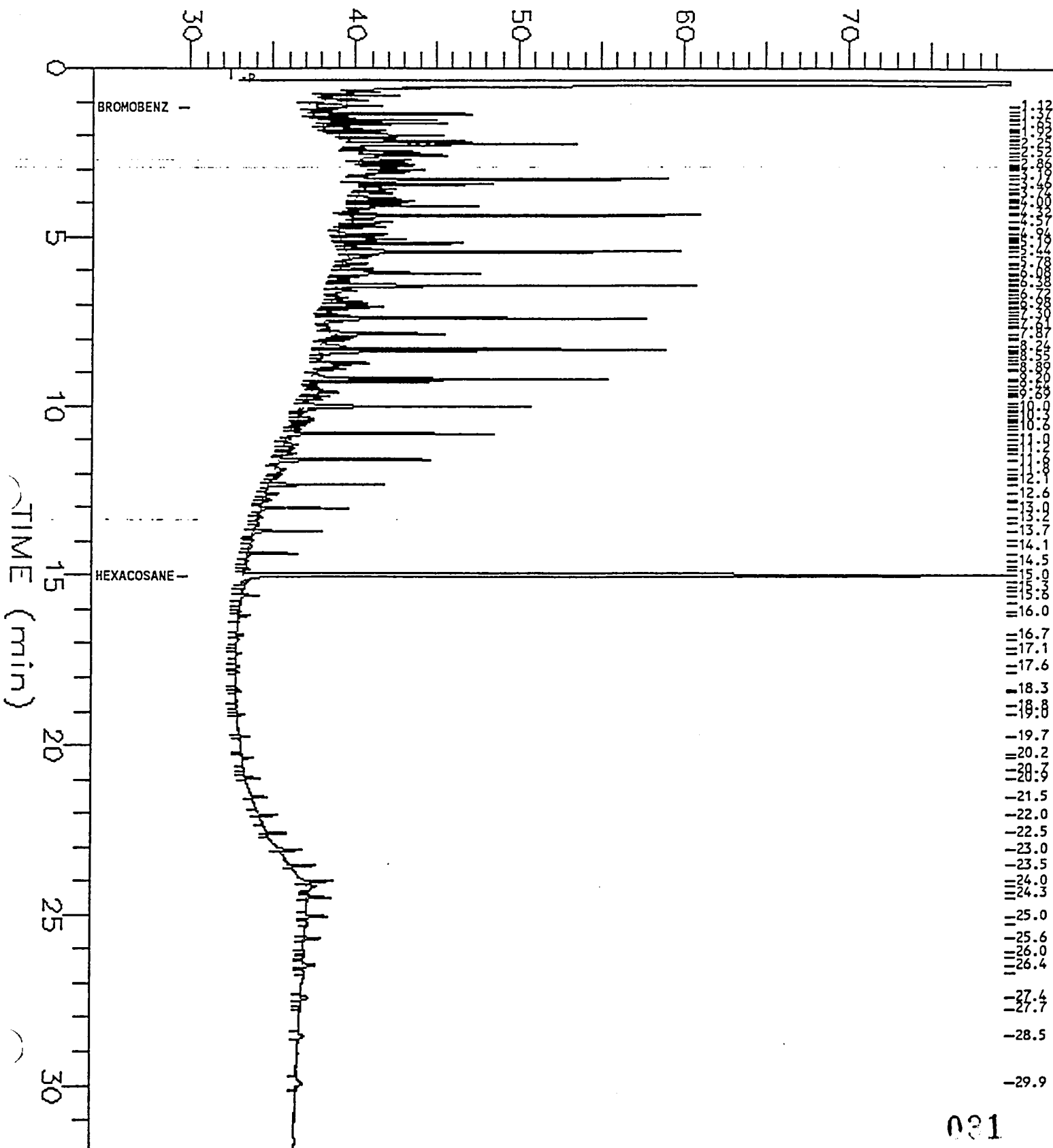
Sample Name : DIESEL 500MG/L
FileName : g:\gc13\chb\036B002.raw
Method : TEH.ins
Start Time : 0.00 min
Scale Factor: -1

End Time : 31.92 min
Plot Offset: 30 mV

Sample #: 95WS1672
Date : 2/5/96 09:24 AM
Time of Injection: 2/5/96 08:50 AM
Low Point : 29.87 mV
Plot Scale: 50 mV
High Point : 79.87 mV

Page 1 of 1

RESPONSE (mV)



Diesel

GC15 Channel A TEH

Sample Name : CCV,96WS1948,DSL

FileName : C:\GC15\CHB\067B021.RAW

Method : BTEH.MTH

Start Time : 0.01 min

Scale Factor: 0.0

End Time : 31.91 min

Plot Offset: 42 mV

Sample #: DSL

Date : 3/8/96 01:45 PM

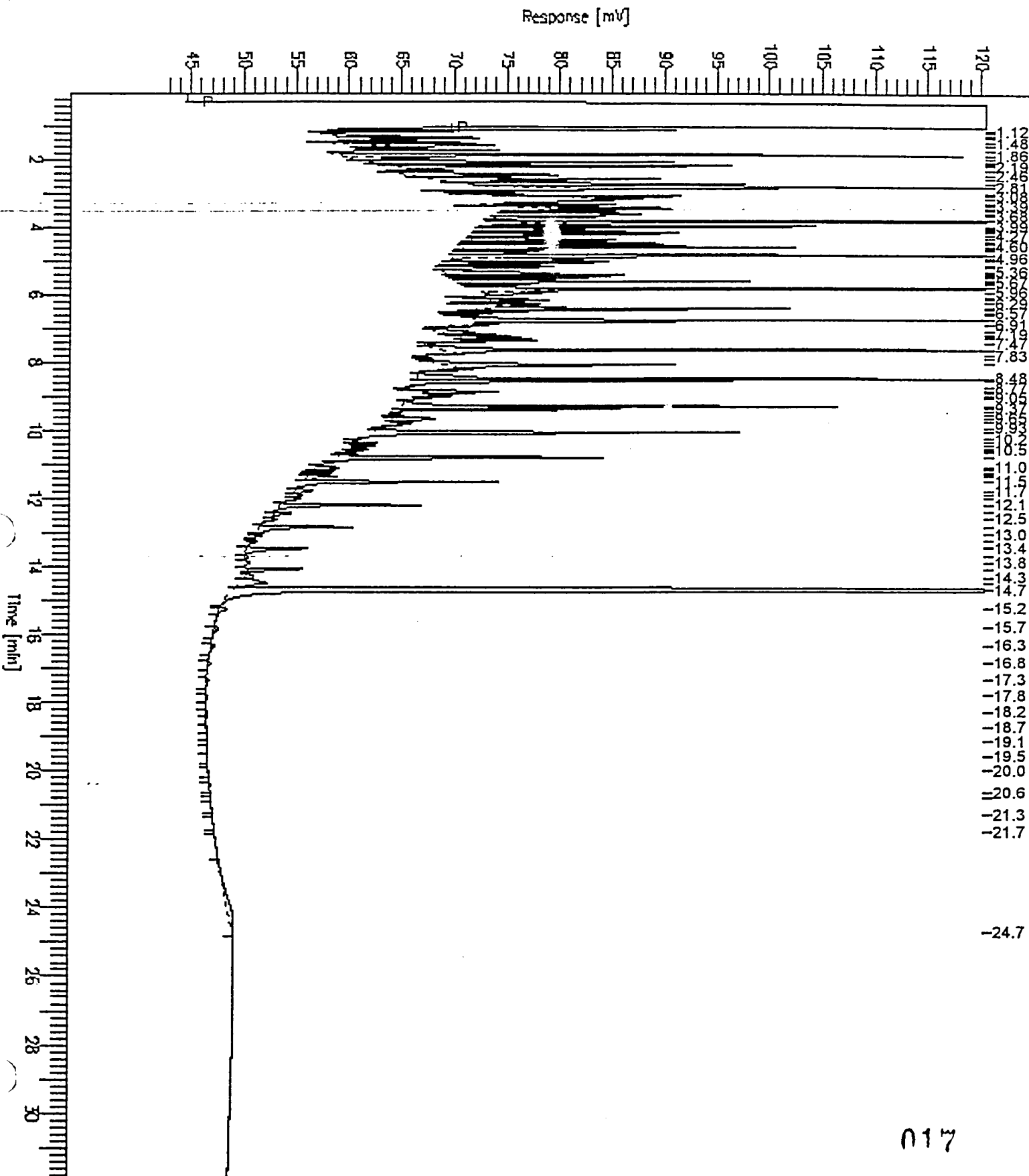
Time of Injection: 3/8/96 05:52 AM

Low Point : 42.49 mV

Plot Scale: 78.0 mV

Page 1 of 1

High Point : 120.49 mV



017

TEH Chromatogram-GC13 CH B

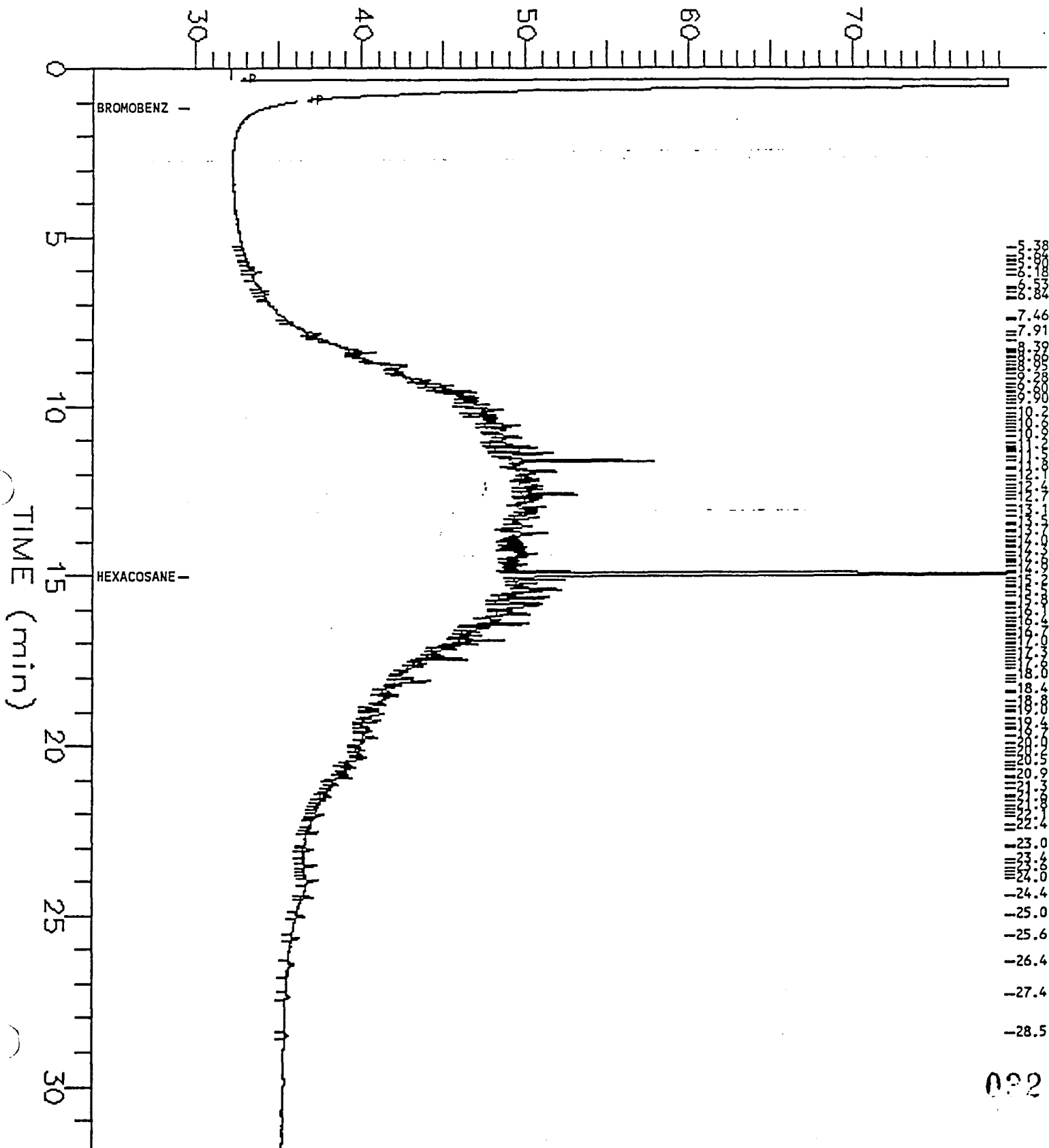
Sample Name : HYDRAULIC OIL 1000MG/L
 FileName : g:\gc13\chb\036B004.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 30 mV

Sample #: 95WS1477
 Date : 2/5/96 10:49 AM
 Time of Injection: 2/5/96 10:15 AM
 Low Point : 29.53 mV
 High Point : 79.53 mV
 Plot Scale: 50 mV

Page 1 of 1

RESPONSE (mV)



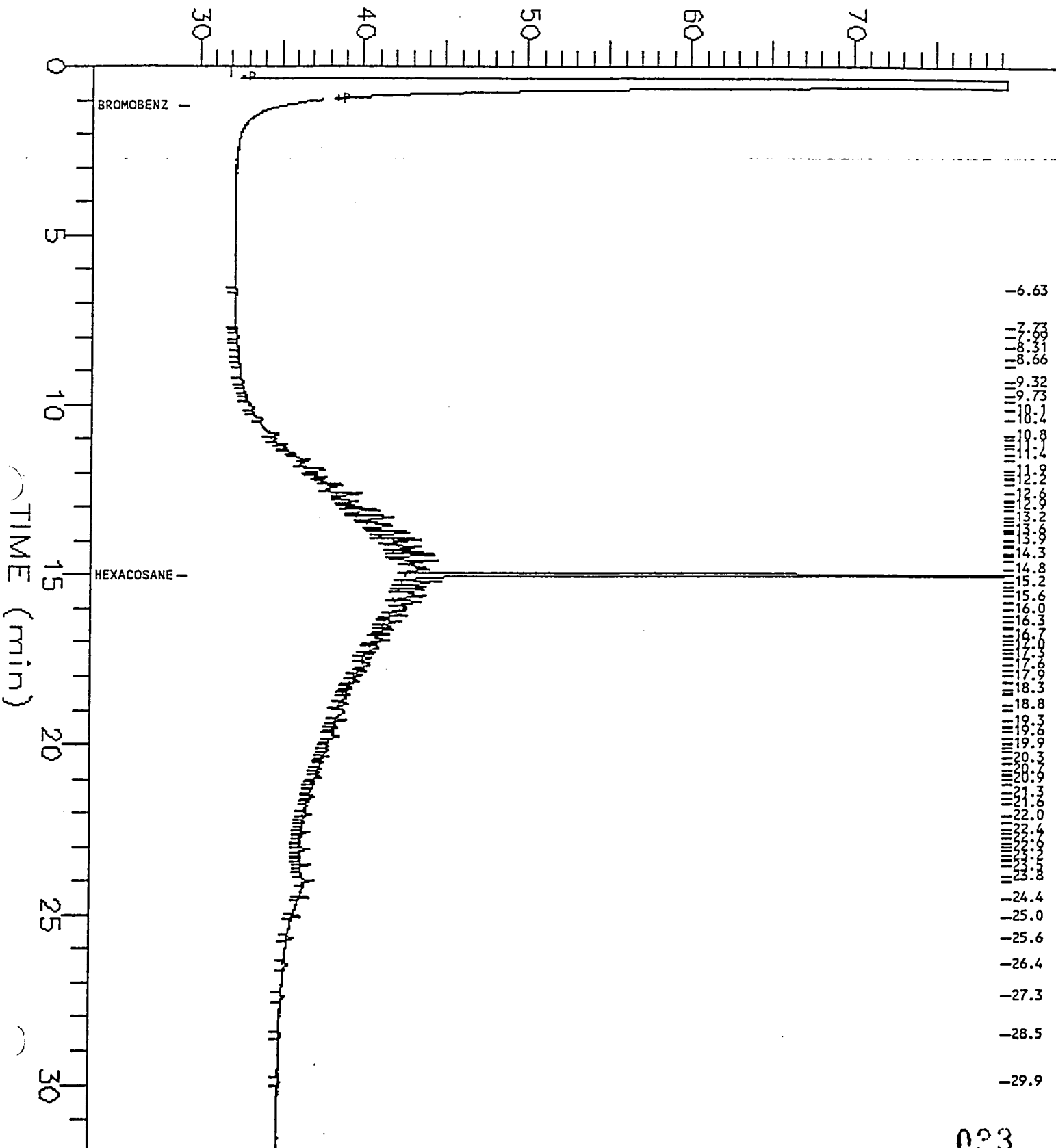
TEH Chromatogram-GC13 CH B

Sample Name : MOTOR OIL 500MG/L
 FileName : g:\gc13\chb\0368005.raw
 Method : TEH.ins
 Start Time : 0.00 min
 Scale Factor: -1

End Time : 31.92 min
 Plot Offset: 29 mV

Sample #: 95WS1596
 Date : 2/5/96 11:31 AM
 Time of Injection: 2/5/96 10:58 AM
 Low Point : 29.31 mV
 Plot Scale: 50 mV
 Page 1 of 1
 High Point : 79.31 mV

RESPONSE (mV)

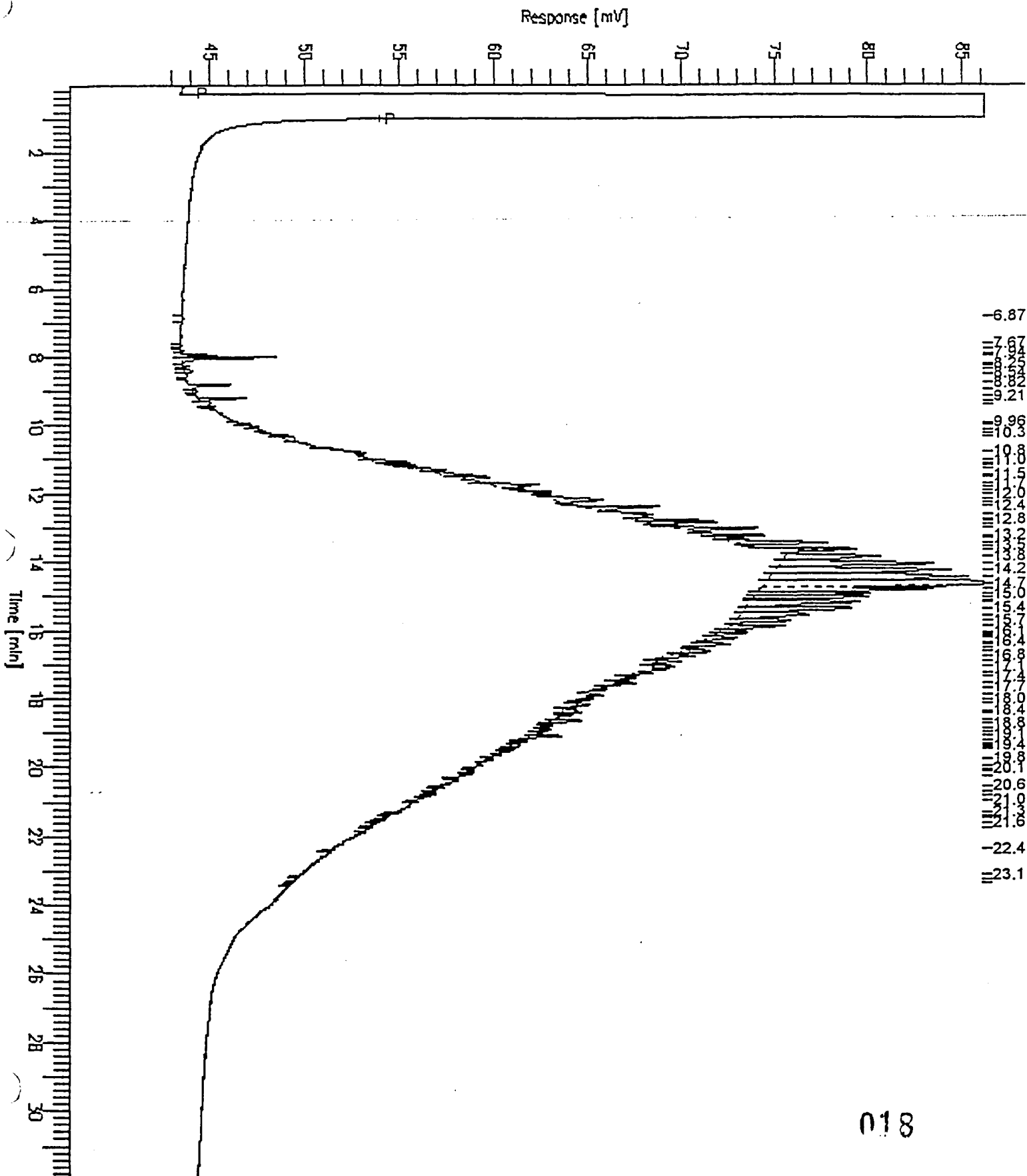


Sample Name : *MOTOR OIL*
FileName : C:\GC15\CHB\067B008.RAW
Method : BTEH.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 42 mV

Sample #:
Date : 3/8/96 02:01 PM
Time of Injection: 3/7/96 08:23 PM
Low Point : 42.50 mV
Plot Scale: 43.7 mV
High Point : 86.16 mV

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018



Lab #: 124235

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons	
Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: LUFT
Location: Former UST Sites DO 0024	
METHOD BLANK	
Matrix: Soil	Prep Date: 02/01/96
Batch#: 25700	Analysis Date: 02/02/96
Units: mg/Kg	
Diln Fac: 1	

MB Lab ID: QC14211

Analyte	Result
Diesel Range	<10
Hydraulic Fluid	<250
JP5 (C10-C16)	<10
Motor Oil C22-C50	<250

Surrogate	%Rec	Recovery Limits
Hexacosane	94	60-140



Lab #: 124235

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

METHOD BLANK

Matrix: Water
Batch#: 25709
Units: ug/L
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/05/96

MB Lab ID: QC14256

Analyte	Result	
Diesel Range	<50	
Hydraulic Fluid	<1300	
JP5 (C10-C16)	<50	
Motor Oil C22-C50	<1300	
Surrogate	%Rec	Recovery Limits
Hexacosane	100	60-140

NM: Not meaningful
LR: Over linear range



Lab #: 124626

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

METHOD BLANK

Matrix: Soil
Batch#: 26220
Units: mg/Kg
Diln Fac: 1

Prep Date: 03/01/96
Analysis Date: 03/07/96

MB Lab ID: QC16344

Analyte	Result	
JP5 (C10-C16)	<10	
Diesel Range	<10	
Motor Oil Range	<50	
Surrogate	%Rec	Recovery Limits
Hexacosane	89	60-140



Lab #: 124235

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 25700
Units: mg/Kg
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/02/96

LCS Lab ID: QC14212

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	381.6	495	77	60-140
Surrogate	%Rec	Limits		
Hexacosane	93	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

Lab #: 124626

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 26220
Units: mg/Kg
Diln Fac: 1

Prep Date: 03/01/96
Analysis Date: 03/04/96

LCS Lab ID: QC16345

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	409	495	83	60-140
Surrogate	%Rec	Limits		
Hexacosane	107	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 124235

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons	
Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 3520
Location: Former UST Sites DO 0024	
BLANK SPIKE/BLANK SPIKE DUPLICATE	
Matrix: Water	Prep Date: 02/01/96
Batch#: 25709	Analysis Date: 02/05/96
Units: ug/L	
Diln Fac: 1	

BS Lab ID: QC14257

Analyte	Spike Added	BS	%Rec #	Limits
Diesel Range	2475	2495	101	60-140
Surrogate	%Rec	Limits		
Hexacosane	103	60-140		

BSD Lab ID: QC14258

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel Range	2475	2337	94	60-140	7	<35
Surrogate	%Rec	Limits				
Hexacosane	103	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

Lab #: 124626

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons			
Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	LUFT
Location:	El Toro MCAS, Former UST		
MATRIX SPIKE/MATRIX SPIKE DUPLICATE			
Field ID:	ZZZZZZ	Sample Date:	02/27/96
Lab ID:	124612-044	Received Date:	02/29/96
Matrix:	Soil	Prep Date:	03/01/96
Batch#:	26220	Analysis Date:	03/05/96
Units:	mg/Kg dry weight	Moisture:	11%
Diln Fac:	1		

MS Lab ID: QC16346

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel Range	556.2	<112.4	577.5	104	60-140
Surrogate	%Rec	Limits			
Hexacosane	121	60-140			

MSD Lab ID: QC16347

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel Range	556.2	450.6	81	60-140	25	<30
Surrogate	%Rec	Limits				
Hexacosane	114	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

011



TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-001	96-IRP15-SB01-S-248	25713	01/29/96	02/02/96	02/02/96	12%
124235-002	96-IRP15-SB02-S-249	25713	01/29/96	02/02/96	02/02/96	8%
124235-003	96-IRP15-SB03-S-250	25713	01/29/96	02/02/96	02/02/96	6%
124235-004	96-IRP15-SB04-S-251	25713	01/29/96	02/02/96	02/02/96	8%

Analyte	Units	124235-001	124235-002	124235-003	124235-004
Diln Fac:		1	1	1	1
Gasoline	mg/Kg	<1.1	<1.1	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1	<1.1	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	97	95	94	94
Bromobenzene	%REC	103	101	100	98



TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-005	96-IRP15-SB05-S-252	25713	01/29/96	02/02/96	02/02/96	1%
124235-006	96-IRP15-SB06-S-253	25713	01/29/96	02/02/96	02/02/96	14%
124235-007	96-IRP15-SB07-S-254	25713	01/29/96	02/02/96	02/02/96	9%
124235-008	96-IRP15-SB08-S-255	25713	01/29/96	02/02/96	02/02/96	11%

Analyte	Units	124235-005	124235-006	124235-007	124235-008
Diln Fac:		1	1	1	1
Gasoline	mg/Kg	<1	<1.2	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1	<1.2	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	95	95	91	94
Bromobenzene	%REC	99	100	100	101



TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-009	96-IRP15-SB05-S-256	25713	01/29/96	02/02/96	02/02/96	6%
124235-012	96-IRP-19-SB01-S-259	25713	01/29/96	02/02/96	02/02/96	6%
124235-013	96-IRP-19-SB02-S-260	25713	01/29/96	02/02/96	02/02/96	7%
124235-014	96-IRP-19-SB03-S-261	25713	01/29/96	02/02/96	02/02/96	6%

Analyte	Units	124235-009	124235-012	124235-013	124235-014
Diln Fac:		1	1	1	1
Gasoline	mg/Kg	<1.1	<1.1	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1	<1.1	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	71	97	98	99
Bromobenzene	%REC	73	103	107	106

TVH-TOTAL VOLATILE HYDROCARBONS

PAGE 4 OF 4

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SAN DIEGO, CA 92132

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TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-010	96-IRP15-ER-257	25694	01/29/96	02/01/96	02/01/96	
124235-011	96-TB-W-258	25694	01/29/96	02/01/96	02/01/96	
124235-018	96-IRP19-ER-265	25694	01/29/96	02/01/96	02/01/96	

Analyte	Units	124235-010	124235-011	124235-018
Diln Fac:		1	1	1
Gasoline	ug/L	<50	<50	<50
Jet Fuel #4 (JP4)	ug/L	<50	<50	<50
Surrogate				
Trifluorotoluene	%REC	88	89	87
Bromobenzene	%REC	84	84	83



TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-002	96-IRP15-S-269	26204	02/29/96	03/02/96	03/02/96	10%
124626-003	96-IRP15-S-270	26204	02/29/96	03/02/96	03/02/96	11%
124626-004	96-IRP15-S-271	26204	02/29/96	03/02/96	03/02/96	9%
124626-005	96-IRP15-S-272	26204	02/29/96	03/02/96	03/02/96	6%

Analyte	Units	124626-002	124626-003	124626-004	124626-005
Diln Fac:		1	1	1	1
Gasoline	mg/Kg	<1.1	<1.1	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1	<1.1	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	91	96	94	94
Bromobenzene	%REC	83	87	87	84



TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-006	96-IRP15-S-273	26204	02/29/96	03/02/96	03/02/96	10%

Analyte	Units	124626-006
Diln Fac:		1
Gasoline	mg/Kg	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1
Surrogate		
Trifluorotoluene	%REC	93
Bromobenzene	%REC	82



Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons			
Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		
METHOD BLANK			
Matrix:	Soil	Prep Date:	02/02/96
Batch#:	25713	Analysis Date:	02/02/96
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC14288

Analyte	Result	
Gasoline	<1.0	
Jet Fuel #4 (JP4)	<1.0	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	95	52-127
Bromobenzene	91	45-140



Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 25694
Units: ug/L
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/01/96

MB Lab ID: QC14190

Analyte	Result	
Gasoline	<50	
Jet Fuel #4 (JP4)	<50	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	88	69-120
Bromobenzene	83	70-122

056



Lab #: 124626

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 26204
Units: mg/Kg
Diln Fac: 1

Prep Date: 03/01/96
Analysis Date: 03/01/96

MB Lab ID: QC16275

Analyte	Result	
Gasoline	<1.0	
Jet Fuel #4 (JP4)	<1.0	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	106	52-127
Bromobenzene	98	45-140



Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons	
Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	
LABORATORY CONTROL SAMPLE	
Matrix: Soil	Prep Date: 02/02/96
Batch#: 25713	Analysis Date: 02/02/96
Units: mg/Kg	
Diln Fac: 1	

LCS Lab ID: QC14286

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline	10.3	10	103	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	118	52-127		
Bromobenzene	117	45-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

057



Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons	
Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	
LABORATORY CONTROL SAMPLE	
Matrix: Water	Prep Date: 02/01/96
Batch#: 25694	Analysis Date: 02/01/96
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC14193

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline	2159	2000	108	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	79	69-120		
Bromobenzene	91	70-122		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

Lab #: 124626

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons			
Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)		
Project#: 17486	Prep Method: EPA 5030		
Location: El Toro MCAS, Former UST			
LABORATORY CONTROL SAMPLE			
Matrix: Soil	Prep Date:	03/01/96	
Batch#: 26204	Analysis Date:	03/01/96	
Units: mg/Kg			
Diln Fac: 1			

LCS Lab ID: QC16413

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline	9.4	10	94	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	98	52-127		
Bromobenzene	78	45-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

NM: Not meaningful

086

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-001	96-IRP15-SB01-S-248	25713	01/29/96	02/02/96	02/02/96	12%
124235-002	96-IRP15-SB02-S-249	25713	01/29/96	02/02/96	02/02/96	8%
124235-003	96-IRP15-SB03-S-250	25713	01/29/96	02/02/96	02/02/96	6%
124235-004	96-IRP15-SB04-S-251	25713	01/29/96	02/02/96	02/02/96	8%

Analyte	Units	124235-001	124235-002	124235-003	124235-004
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5.7	<5.4	<5.3	<5.4
Toluene	ug/Kg	<5.7	<5.4	<5.3	<5.4
Ethylbenzene	ug/Kg	<5.7	<5.4	<5.3	<5.4
m,p-Xylenes	ug/Kg	<5.7	<5.4	<5.3	<5.4
o-Xylene	ug/Kg	<5.7	<5.4	<5.3	<5.4
Surrogate					
Trifluorotoluene	%REC	100	99	98	97
Bromobenzene	%REC	107	105	104	101

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-005	96-IRP15-SB05-S-252	25713	01/29/96	02/02/96	02/02/96	1%
124235-006	96-IRP15-SB06-S-253	25713	01/29/96	02/02/96	02/02/96	14%
124235-007	96-IRP15-SB07-S-254	25713	01/29/96	02/02/96	02/02/96	9%
124235-008	96-IRP15-SB08-S-255	25713	01/29/96	02/02/96	02/02/96	11%

Analyte	Units	124235-005	124235-006	124235-007	124235-008
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5.1	<5.8	<5.5	<5.6
Toluene	ug/Kg	<5.1	<5.8	<5.5	<5.6
Ethylbenzene	ug/Kg	<5.1	<5.8	<5.5	<5.6
m,p-Xylenes	ug/Kg	<5.1	<5.8	<5.5	<5.6
o-Xylene	ug/Kg	<5.1	<5.8	<5.5	<5.6
Surrogate					
Trifluorotoluene	%REC	99	99	96	95
Bromobenzene	%REC	103	104	105	101

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-009	96-IRP15-SB05-S-256	25713	01/29/96	02/02/96	02/02/96	6%
124235-012	96-IRP-19-SB01-S-259	25713	01/29/96	02/02/96	02/02/96	6%
124235-013	96-IRP-19-SB02-S-260	25713	01/29/96	02/02/96	02/02/96	7%
124235-014	96-IRP-19-SB03-S-261	25713	01/29/96	02/02/96	02/02/96	6%

Analyte	Units	124235-009	124235-012	124235-013	124235-014
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5.3	<5.3	<5.4	<5.3
Toluene	ug/Kg	41	6.2	13	40
Ethylbenzene	ug/Kg	<5.3	<5.3	<5.4	<5.3
m,p-Xylenes	ug/Kg	<5.3	<5.3	<5.4	<5.3
o-Xylene	ug/Kg	<5.3	<5.3	<5.4	<5.3
Surrogate					
Trifluorotoluene	%REC	72	97	98	98
Bromobenzene	%REC	75	104	106	106

BTXE
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SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

BTXE			
Client:	OHM Remediation Services	Analysis Method:	EPA 8020
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-010	96-IRP15-ER-257	25694	01/29/96	02/01/96	02/01/96	
124235-011	96-TB-W-258	25694	01/29/96	02/01/96	02/01/96	
124235-018	96-IRP19-ER-265	25694	01/29/96	02/01/96	02/01/96	

Analyte	Units	124235-010	124235-011	124235-018
Diln Fac:		1	1	1
Benzene	ug/L	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5
Surrogate				
Trifluorotoluene	%REC	98	97	97
Bromobenzene	%REC	95	96	94



BTXE

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-002	96-IRP15-S-269	26204	02/29/96	03/02/96	03/02/96	10%
124626-003	96-IRP15-S-270	26204	02/29/96	03/02/96	03/02/96	11%
124626-004	96-IRP15-S-271	26204	02/29/96	03/02/96	03/02/96	9%
124626-005	96-IRP15-S-272	26204	02/29/96	03/02/96	03/02/96	6%

Analyte	Units	124626-002	124626-003	124626-004	124626-005
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5.6	<5.6	<5.5	<5.3
Toluene	ug/Kg	<5.6	<5.6	<5.5	<5.3
Ethylbenzene	ug/Kg	<5.6	<5.6	<5.5	<5.3
m,p-Xylenes	ug/Kg	<5.6	<5.6	<5.5	<5.3
o-Xylene	ug/Kg	<5.6	<5.6	<5.5	<5.3
Surrogate					
Trifluorotoluene	%REC	86	89	88	89
Bromobenzene	%REC	75	78	79	78



BTXE

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-006	96-IRP15-S-273	26204	02/29/96	03/02/96	03/02/96	10%

Analyte	Units	124626-006
Diln Fac:		1
Benzene	ug/Kg	<5.6
Toluene	ug/Kg	<5.6
Ethylbenzene	ug/Kg	<5.6
m,p-Xylenes	ug/Kg	<5.6
o-Xylene	ug/Kg	<5.6
Surrogate		
Trifluorotoluene	%REC	88
Bromobenzene	%REC	74



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 124626-001
CLIENT: OHM REMEDIATION SERVICES
PROJECT ID: 17486
LOCATION: MCAS EL TORO
SAMPLE ID: 96-0229-W-TB

DATE SAMPLED: 02/29/96
DATE RECEIVED: 03/01/96
DATE ANALYZED: 03/05/96
BATCH NO: 26267

EPA 8020: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	REPORTING LIMIT ug/L
Benzene.....	ND	0.5
Toluene.....	ND	0.5
Ethyl Benzene.....	ND	0.5
m,p-Xylene.....	ND	0.5
o-Xylene.....	ND	0.5

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====

Bromobenzene	101 % (Limits: 81-124)
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=====



Lab #: 124235

BATCH QC REPORT

BTXE	
Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	
METHOD BLANK	
Matrix: Soil	Prep Date: 02/02/96
Batch#: 25713	Analysis Date: 02/02/96
Units: ug/Kg	
Diln Fac: 1	

MB Lab ID: QC14288

Analyte	Result	
Benzene	<5.0	
Toluene	<5.0	
Ethylbenzene	<5.0	
m,p-Xylenes	<5.0	
o-Xylene	<5.0	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	99	43-114
Bromobenzene	96	47-112



Lab #: 124235

BATCH QC REPORT

BTXE			
Client: OHM Remediation Services		Analysis Method: EPA 8020	
Project#: 17486		Prep Method: EPA 5030	
Location: Former UST Sites DO 0024			
METHOD BLANK			
Matrix: Water		Prep Date: 02/01/96	
Batch#: 25694		Analysis Date: 02/01/96	
Units: ug/L			
Diln Fac: 1			

MB Lab ID: QC14190

Analyte	Result	
Benzene	<0.5	
Toluene	<0.5	
Ethylbenzene	<0.5	
m,p-Xylenes	<0.5	
o-Xylene	<0.5	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	97	58-130
Bromobenzene	94	62-131



Lab #: 124626

BATCH QC REPORT

Page 1 of 1

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: EPA 8020
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 26204
Units: ug/Kg
Diln Fac: 1

Prep Date: 03/01/96
Analysis Date: 03/01/96

MB Lab ID: QC16275

Analyte	Result	
Benzene	<5.0	
Toluene	<5.0	
Ethylbenzene	<5.0	
m,p-Xylenes	<5.0	
o-Xylene	<5.0	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	104	43-114
Bromobenzene	95	47-112

045



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 124626-METHOD BLANK
CLIENT: OHM REMEDIATION SERVICES
PROJECT ID: 17486
LOCATION: MCAS EL TORO
SAMPLE ID: MB, QC16513

DATE ANALYZED: 03/05/96
BATCH NO: 26267

EPA 8020: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	REPORTING LIMIT ug/L
Benzene.....	ND	0.5
Toluene.....	ND	0.5
Ethyl Benzene.....	ND	0.5
m,p-Xylene.....	ND	0.5
o-Xylene.....	ND	0.5

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====

Bromobenzene

=====

101 % (Limits: 81-124)



Lab #: 124235

BATCH QC REPORT

BTXE	
Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	
LABORATORY CONTROL SAMPLE	
Matrix: Soil	Prep Date: 02/02/96
Batch#: 25713	Analysis Date: 02/02/96
Units: ug/Kg	
Diln Fac: 1	

LCS Lab ID: QC14287

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	101.5	100	102	80-120
Toluene	107.4	100	107	80-120
Ethylbenzene	106	100	106	80-120
m,p-Xylenes	210.7	200	105	80-120
o-Xylene	107.6	100	108	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	103	43-114		
Bromobenzene	98	47-112		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits



Lab #: 124626

BATCH QC REPORT

Page 1 of 1

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS, Former UST

Analysis Method: EPA 8020
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 26204
Units: ug/Kg
Diln Fac: 1

Prep Date: 03/01/96
Analysis Date: 03/01/96

LCS Lab ID: QC16276

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	106	100	106	80-120
Toluene	110	100	110	80-120
Ethylbenzene	106	100	106	80-120
m,p-Xylenes	216	200	108	80-120
o-Xylene	111	100	111	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	101	58-130		
Bromobenzene	96	62-131		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits



Lab #: 124235

BATCH QC REPORT

Page 1 of 1

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 25694
Units: ug/L
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/01/96

BS Lab ID: QC14191

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	20	20.2	101	80-120
Toluene	20	20.7	104	80-120
Ethylbenzene	20	20.5	103	80-120
m,p-Xylenes	40	41.3	103	80-120
o-Xylene	20	20.8	104	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	97	58-130		
Bromobenzene	96	62-131		

BSD Lab ID: QC14192

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	20	20.3	102	80-120	1	<20
Toluene	20	20.8	104	80-120	1	<20
Ethylbenzene	20	20.6	103	80-120	1	<20
m,p-Xylenes	40	41.5	104	80-120	1	<20
o-Xylene	20	20.9	105	80-120	1	<20
Surrogate	%Rec	Limits				
Trifluorotoluene	98	58-130				
Bromobenzene	96	62-131				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits



8010/8020 Laboratory Control Sample Report [Quant Column]

Date Analyzed: 05-MAR-96

LCS Datafile: 065W005

Matrix: WATER

Operator: AMP.

Batch No: 26267 326065168005

GC ID: GC12

EPA METHOD 8010: HALOGENATED VOLATILE ORGANICS

	Instrdg	SpikeAmt	% Rec	Limits
1,1-Dichloroethene	17.7	20	89 %	68-134%
Trichloroethene	19.0	20	95 %	85-141%
Chlorobenzene	18.9	20	95 %	69-135%
Surrogate Recovery				
Bromobenzene	98.7	100	99 %	85-119%

EPA METHOD 8020: AROMATIC VOLATILE ORGANICS

Benzene	19.1	20	95 %	88-118%
Toluene	18.3	20	92 %	85-119%
Chlorobenzene	19.6	20	98 %	90-115%
Surrogate Recovery				
Bromobenzene	101.	100	101 %	81-124%

Column: Rtx 502.2

Water Limits based on LCS Data Generated 5/5/95

Soil Limits based on 3/90 SOW

Results within Specifications - PASS



Lab #: 124235

BATCH QC REPORT

BTXE	
Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	
MATRIX SPIKE/MATRIX SPIKE DUPLICATE	
Field ID: 96-IRP15-SB01-S-248	Sample Date: 01/29/96
Lab ID: 124235-001	Received Date: 01/30/96
Matrix: Soil	Prep Date: 02/02/96
Batch#: 25713	Analysis Date: 02/02/96
Units: ug/Kg dry weight	Moisture: 12%
Diln Fac: 1	

MS Lab ID: QC14289

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	113.6	<5.682	114.1	100	75-125
Toluene	113.6	<5.682	120.5	106	75-125
Ethylbenzene	113.6	<5.682	113	99	75-125
m,p-Xylenes	227.3	<5.682	229.5	101	75-125
o-Xylene	113.6	<5.682	120.9	106	75-125
Surrogate	%Rec	Limits			
Trifluorotoluene	98	43-114			
Bromobenzene	104	47-112			

MSD Lab ID: QC14290

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	113.6	107.6	95	75-125	6	<20
Toluene	113.6	112.2	99	75-125	7	<20
Ethylbenzene	113.6	104.7	92	75-125	8	<20
m,p-Xylenes	227.3	216.7	95	75-125	6	<20
o-Xylene	113.6	113.1	100	75-125	7	<20
Surrogate	%Rec	Limits				
Trifluorotoluene	99	43-114				
Bromobenzene	105	47-112				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits



Lab #: 124626

BATCH QC REPORT

Page 1 of 1

BTXE			
Client: OHM Remediation Services		Analysis Method: EPA 8020	
Project#: 17486		Prep Method: EPA 5030	
Location: El Toro MCAS, Former UST			
MATRIX SPIKE/MATRIX SPIKE DUPLICATE			
Field ID: ZZZZZZ	Sample Date: 02/27/96		
Lab ID: 124596-001	Received Date: 02/28/96		
Matrix: Soil	Prep Date: 03/01/96		
Batch#: 26204	Analysis Date: 03/01/96		
Units: ug/Kg dry weight	Moisture: 14%		
Diln Fac: 1			

MS Lab ID: QC16277

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	116.3	<5.814	125.6	108	75-125
Toluene	116.3	<5.814	124.4	107	75-125
Ethylbenzene	116.3	<5.814	112.8	97	75-125
m,p-Xylenes	232.6	<5.814	229.1	99	75-125
o-Xylene	116.3	<5.814	118.6	102	75-125
Surrogate	%Rec	Limits			
Trifluorotoluene	88	58-130			
Bromobenzene	76	62-131			

MSD Lab ID: QC16278

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	116.3	124.4	107	75-125	1	<20
Toluene	116.3	124.4	107	75-125	0	<20
Ethylbenzene	116.3	115.1	99	75-125	2	<20
m,p-Xylenes	232.6	230.2	99	75-125	1	<20
o-Xylene	116.3	119.8	103	75-125	1	<20
Surrogate	%Rec	Limits				
Trifluorotoluene	89	58-130				
Bromobenzene	77	62-131				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

Appendix F
Nonhazardous Waste Manifest

**CANDELARIA ENVIRONMENTAL CO.
BIOTREATMENT FACILITY**

EPA ID # IRC 356613091

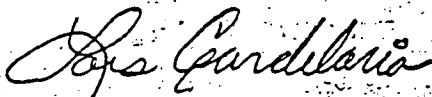
**TITLE TRANSFER
&
HOLD HARMLESS STATEMENT**

Upon acceptance and delivery of "nonhazardous** hydrocarbon contaminated soil" at the C.E.C. Biotreatment Facility, and receipt of payment in full, the Candelaria Environmental Co. fully indemnifies (generator) COMMANDING GENERAL (IAW)

for soil received from (site) MCAS-EL TORO, PO BOX 95001

SANTA ANA CA 92709-5001 on (date) 4/18/96

for any environmental releases or damages associated with Candelaria Environmental Company's management of the soil at the C.E.C. Biotreatment Facility.



Candelaria Environmental Co.

** As defined by the Resource Conservation and Recovery Act (RCRA)
and Title 22 of the California Code of Regulations, Article 11.

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST		1. Generator's USEPA ID No. CA 6170023208		Manifest Document No. 96010		2. Page 1 of 1	
3. Generator's Name and Mailing Address Commanding General (IAW) MCAS-El Toro, P.O. Box 95001 Santa Ana, CA 927095001 4. Generator's Phone () 714 726-2772				1748606010			
5. Transporter 1 Company Name WEST COAST 316		6. US EPA ID Number CAD043655927		A. State Transporter's ID 88822		B. Transporter 1 Phone 714-522-0282	
7. Transporter 2 Company Name		8. US EPA ID Number		C. State Transporter's ID		D. Transporter 2 Phone	
9. Designated Facility Name and Site Address Candelaria Environmental Svc 4001 Candelaria Lane Anza, CA 92539		10. US EPA ID Number		E. State Facility's ID IRC356613091		F. Facility's Phone (619) 941-3267	
11. WASTE DESCRIPTION				Containers No. Type		13. Total Quantity	
•Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)				001 OT		00018	
b.							
c.							
d.							
F. Additional Descriptions for Materials Listed Above ity signed manifests to ATTN: Brionne Bischke at fax # (510) 463-0719 upon receipt				Project #17486; fax facility G. Handling Codes for Wastes Listed Above			
15. Special Handling Instructions and Additional Information 8:00 - 9:45 LOADING TIME				Emergency Contact # (714) 451-1660			
16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.							
Printed/Typed Name Eddie Benavente				Signature WEIGHMASTER CERTIFICATION			
17. Transporter 1 Acknowledgement of Receipt of Materials Printed/Typed Name Steve FLUSTR				Signature WAS weighed, measured, or counted by a weighmaster, who is a duly licensed person, and is a recognized authority on accuracy, as prescribed by the Department of Industrial Relations, Division 5 of the California Business and Professions Code, administered by the Division of Measurements Standards, or the California Department of Food and Agriculture.			
18. Transporter 2 Acknowledgement of Receipt of Materials Printed/Typed Name				Signature			
19. Discrepancy Indication Space				CANDELARIA WEIGHMASTER			
20. Facility Owner or Operator, Certification of receipt of the waste materials covered by this manifest				DATE 4/18/96			
Printed/Typed Name				GROSS 50.09 TARE 13.20 NET 27.89 POUNDS			
Signature Welghed at 4001 Candelaria Lane, Anza, CA 92539				DATE 4/18/96			



1D: MHY 02 96 9:55 NO.001 P.00

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. C A 6 1 7 0 0 2 3 2 0 8		Manifest Document No. 96009		2. Page 1 of 1	
3. Generator's Name and Mailing Address Commanding General (IAW) MCAS-El Toro, P.O. Box 95001 Santa Ana, CA 927095001 4. Generator's Phone () 714 726-2772				1748696009			
5. Transporter 1 Company Name WEST COAST S & G		6. US EPA ID Number CAD043655927		A. State Transporter's ID 88822		B. Transporter 1 Phone 714 522 0282	
7. Transporter 2 Company Name		8. US EPA ID Number		C. State Transporter's ID		D. Transporter 2 Phone	
9. Designated Facility Name and Site Address Candelaria Environmental Svc 4001 Candelaria Lane Anza, CA 92539		10. US EPA ID Number		E. State Facility's ID IRC356613091		F. Facility's Phone (619) 941-3267	
11. WASTE DESCRIPTION				Containers No. Type		13. Total Quantity	
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)				001 8T		00018	
b.							
c.							
d.							
12. Additional Descriptions for Materials Listed Above ity signed manifests to ATTN: Brionne Bischke at fax # (510) 63-0719 upon receipt				13. Handling Codes for Wastes Listed Above Project #17486; fax facili 4			
				Emergency Contact # (714) 451-1660			
15. Special Handling Instructions and Additional Information							
16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.							
Printed/Typed Name Eddie Benavente				Signature [Signature] Date Month Day Year 4/18/96			
17. Transporter 1 Acknowledgement of Receipt of Materials				THIS IS TO CERTIFY that the following described commodities were weighed, measured, or counted by a weighmaster whose signature is on this certificate, who is a recognized authority of 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurements Standards of the California Department of Food and Agriculture.			
Printed/Typed Name James Jasper							
18. Transporter 2 Acknowledgement of Receipt of Materials							
Printed/Typed Name							
19. Discrepancy Indication Space				CANDELARIA WEIGHMASTER			
20. Facility Owner or Operator, Certification of receipt of the waste materials covered by this manifest				DEPUTY [Signature] DATE 4/18/96			
Printed/Typed Name				GROSS 41.09 TARE 13.46 NET 27.63 POUNDS Weighed at 4001 Candelaria Lane, Anza, CA 92539			



NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. C A 6 1 7 0 0 2 3 2 0 8		Manifest Document No. 95008		2. Page 1 of 1	
3. Generator's Name and Mailing Address Commanding General (IAW) MCAS-El Toro, P.O. Box 95001 Santa Ana, CA 927095001 4. Generator's Phone () 714 726-2772				1748696008			
5. Transporter 1 Company Name WEST COAST S&C		6. US EPA ID Number CAD043653927		A. State Transporter's ID 88822		B. Transporter 1 Phone 714 522 0282	
7. Transporter 2 Company Name		8. US EPA ID Number		C. State Transporter's ID		D. Transporter 2 Phone	
9. Designated Facility Name and Site Address Candelaria Environmental Svc 4001 Candelaria Lane Ana, CA 92539		10. US EPA ID Number		E. State Facility's ID IRC356613091		F. Facility's Phone (619) 941-3267	
11. WASTE DESCRIPTION				Containers No. Type		13. Total Quantity	
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)				001 OT		00018	
b.							
c.							
d.							
F. Additional Descriptions for Materials Listed Above ity signed manifests to ATTN: Brionne Bischke at fax # (510) 462-0719 upon receipt				Project #17486; fax fac G. Handling Codes for Wastes Listed Above			
15. Special Handling Instructions and Additional Information				Emergency Contact # (714) 451-1660			
16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.							
Printed/Typed Name Eddie Benavente				Signature [Signature] DATE 4/18/96			
17. Transporter 1 Acknowledgement of Receipt of Materials				THIS IS TO CERTIFY that the following described waste was weighed, measured, or counted by a person whose signature is on this certificate, who is a resident of California, and whose signature is accurate and correct as of the date of signing (Section 7 (commencing with 22500) of Division 5 of the California Business and Professions Code, administered by the Division of Motor Vehicles, Department of the California Department of Food and Agriculture.			
Printed/Typed Name Daniel A. Flirsten				Signature [Signature] DATE 4/18/96			
18. Transporter 2 Acknowledgement of Receipt of Materials				Signature [Signature] DATE 4/18/96			
Printed/Typed Name				Signature [Signature] DATE 4/18/96			
19. Discrepancy Indication Space				CANDELARIA WEIGHMASTER DEPUTY [Signature] DATE 4/18/96 GROSS 35.35 TARE 13.38 NET 21.97 Weighed at 4001 Candelaria Lane, Ana, CA 92539			
20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, as noted in Section 7 (commencing with 22500) of Division 5 of the California Business and Professions Code, administered by the Division of Motor Vehicles, Department of the California Department of Food and Agriculture.				Printed/Typed Name [Signature] DATE 4/18/96			



NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. CA 6170023208		Manifest Document No. 96006		2. Page 1 of 1	
3. Generator's Name and Mailing Address Commanding General (IAW) MCAS-El Toro, P.O. Box 95001 Santa Ana, CA 927095001 4. Generator's Phone () 714 726-2772				1748696006			
5. Transporter 1 Company Name WEST COAST S & L		6. US EPA ID Number CA D043655927		A. State Transporter's ID 88822		B. Transporter 1 Phone 714-522-0282	
7. Transporter 2 Company Name		8. US EPA ID Number		C. State Transporter's ID		D. Transporter 2 Phone	
9. Designated Facility Name and Site Address Candelaria Environmental Svc 4001 Candelaria Lane Ana, CA 92539		10. US EPA ID Number		E. State Facility's ID IRC356613091		F. Facility's Phone (619) 941-3267	
11. WASTE DESCRIPTION				Containers No. Type		13. Total Quantity	
•Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)				001 OT		00018	
b.							
c.							
d.							
F. Additional Descriptions for Materials Listed Above Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 463-0719 upon receipt				12. Handling Codes for Wastes Listed Above			
				Emergency Contact # (714) 451-1660			
15. Special Handling Instructions and Additional Information							
16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations							
Printed/Typed Name Eddie Benavente				Signature <i>[Signature]</i> Date 4/18/96			
17. Transporter 1 Acknowledgement of Receipt of Materials				THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 3 of the California Business and Professions Code, administered by the Division of Measurements Standards of the California Department of Food and Agriculture.			
Printed/Typed Name				Signature			
18. Transporter 2 Acknowledgement of Receipt of Materials				Signature			
Printed/Typed Name				Signature			
19. Discrepancy Indication Space				CANDELARIA WEIGHMASTER			
20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.				DEPUTY <i>[Signature]</i> DATE 4/18/96			
Printed/Typed Name				Signature			
				GROSS 57.71 TARE 13.48 NET 26.43 IN TONS Weighed at 4001 Candelaria Lane, Ana, CA 92539			



NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. CA 6170023208		Manifest Document No. 96007	2. Page 1 of 1
3. Generator's Name and Mailing Address Commanding General (IAW) MCAS-El Toro, P.O. Box 95001 Santa Ana, CA 927095001				1748696007	
4. Generator's Phone () 714 726-2772					
5. Transporter 1 Company Name WEST COAST		6. US EPA ID Number CA12043653927		A. State Transporter's ID 88822	
7. Transporter 2 Company Name		8. US EPA ID Number		B. Transporter 1 Phone 714-522-0282	
9. Designated Facility Name and Site Address Candelaria Environmental Svc 4001 Candelaria Lane Ana, CA 92539		10. US EPA ID Number		C. State Transporter's ID	
				D. Transporter 2 Phone	
				E. State Facility's ID IRC356613091	
				F. Facility's Phone (619) 941-3267	
11. WASTE DESCRIPTION				Containers No. Type	13. Total Quantity
Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)				001 OT	00018
12. Additional Descriptions for Materials Listed Above				14. Unit Wt./Vol.	
Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 453-0719 upon receipt				4	
15. Special Handling Instructions and Additional Information				16. Handling Codes for Wastes Listed Above	
Emergency Contact # (714) 451-1660					
17. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.					
Printed/Typed Name Eddie Benavente				Signature <i>[Signature]</i>	
17. Transporter 1 Acknowledgement of Receipt of Materials				Date Month Day Year 4/18/96	
Printed/Typed Name Greg Anker				Signature <i>[Signature]</i>	
18. Transporter 2 Acknowledgement of Receipt of Materials				Date Month Day Year 4/18/96	
Printed/Typed Name				Signature	
19. Discrepancy Indication Space				CANDELARIA WEGHMASTER	
20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in item 19				DEPUTY <i>[Signature]</i> DATE 4/18/96	
Printed/Typed Name				Signature GROSS	
				38.3 TARE 2.66 NET 35.64 BY INTONS	
Weighed at 4001 Candelaria Lane, Ana, CA 92539					



Appendix G
Data Quality Assessment Report

1.1 Introduction

A data quality assessment (DQA) was performed on the soil and water samples collected from former Installation Restoration Program (IRP) Site 15, Unit 1 at Marine Corps Air Station (MCAS) El Toro, California. The purpose of the DQA is to determine whether the data are of acceptable quality for its intended usage.

Samples from the site were collected and analyzed for total petroleum hydrocarbons (TPH) for gasoline; TPH for JP-4; JP-5; diesel; hydraulic oil and/or motor oil; and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

Analyses were performed according to United States Environmental Protection Agency (EPA) SW846 Methods and California Leaking Underground Fuel (CA LUFT) Tank Manual. The equivalent of EPA Level 3 data validation was performed on 100 percent of the data.

Analytical results were qualified based upon compliance with method protocols, and the *National Functional Guidelines for Organic and Inorganic Data Review* (EPA, 1994). Qualifiers included in the DQA are "U" as not detected, "UJ" as not detected with uncertainty in the reporting limits, "R" as rejected, and "J" as estimated.

1.2 Total Petroleum Hydrocarbons as Diesel, JP-5, Hydraulic Oil, or Motor Oil Ranges

Fourteen soil samples and two equipment rinsate samples were analyzed for TPH as diesel, JP-5, hydraulic oil, or motor oil ranges in accordance with the CA LUFT method.

- **Holding Times** — All samples were extracted and analyzed within the holding times.
- **Laboratory Blanks** — Method blanks were performed at the required frequencies and were free of the target analyte.
- **Instrument Calibration** — Initial calibration was performed as required by the method. Correlation coefficient (r) of the initial calibration was greater than 0.995 as stated in the method for diesel; however, a single point calibration was used for JP-5, hydraulic oil, and motor oil. Continuing calibration verifications were performed at the required frequencies and were within quality control limits.
- **Laboratory Control Sample/Laboratory Control Sample Duplicate** — The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) are used to monitor the overall accuracy and precision of the analytical measurement process. The LCS/LCSD were analyzed at the appropriate frequencies and were within quality control limits.

- **Matrix Spike/Matrix Spike Duplicate** — The matrix spike/matrix spike duplicate (MS/MSD) measures precision and assesses matrix effects. The MS/MSD recoveries and relative percent differences were within the quality control limits.
- **Surrogate** — The surrogates were added to the samples, and their recoveries were within the quality control limits.
- **Summary** — The data quality of the TPH as diesel, JP-5, hydraulic oil, or motor oil ranges analysis was acceptable and the results were considered usable. Overall precision, accuracy, and completeness objectives were met.

1.3 Total Petroleum Hydrocarbons as Gasoline and JP-4 Ranges

Fourteen soil samples and two equipment rinsate samples were analyzed for TPH as gasoline and JP-4 ranges in accordance with the CA LUFT method.

- **Holding Times** — All samples were extracted and analyzed within the holding times.
- **Laboratory Blanks** — Method blanks were performed at the required frequencies and were free of the TPH as gasoline and JP-4 ranges.
- **Instrument Calibration** — Initial calibration was performed as required by the method. The percent relative standard deviation of calibration factors were less than 20 percent. Continuing calibration verifications were performed at the required frequencies. The percent differences of the calibration factors was within the 15 percent quality control limit.
- **Laboratory Control Sample/laboratory Control Sample Duplicate** — The LCS/LCSD are used to monitor the overall accuracy and precision of the analytical measurement process. The LCS/LCSD were analyzed at the appropriate frequencies and were within quality control limits.
- **Matrix Spike/Matrix Spike Duplicate** — The MS/MSD measures precision and assesses matrix effects. MS/MSD were not performed on the IRP 15 samples. LCS/LCSD were performed in place of MS/MSD.
- **Surrogate** — The surrogates were added to the samples and their recoveries were within the quality control limits.
- **Summary** — The data quality of the TPH as gasoline and JP-4 ranges analysis was acceptable and the results were considered usable. Overall precision, accuracy, and completeness objectives were met.

1.4 Benzene, Toluene, Ethylbenzene, and Total Xylenes

Fourteen soil samples, one trip blank sample, and two equipment rinsate samples were collected for benzene, toluene, ethylbenzene, and total xylenes (BTEX) in accordance with EPA Method 8020.

- **Holding Times** — All samples were extracted and analyzed within the holding times.
- **Laboratory Blanks** — Method blanks were performed at the required frequencies and were free of the target analytes.
- **Instrument Calibration** — Initial calibration was performed as required by the method. The percent relative standard deviation of calibration factors were less than 20 percent. Continuing calibration verifications were performed at the required frequencies. The percent differences of the calibration factors were within the 15 percent quality control limits.
- **Laboratory Control Sample/Laboratory Control Sample Duplicate** — The LCS/LCSD are used to monitor the overall accuracy and precision of the analytical measurement process. The LCS/LCSD were analyzed at the appropriate frequencies and were within quality control limits.
- **Matrix Spike/Matrix Spike Duplicate** — The MS/MSD measures precision and assesses matrix effects. The MS/MSD recoveries and relative percent differences were within the quality control limits.
- **Surrogate** — The surrogates were added to the samples, and their recoveries were within the quality control limits.
- **Summary** — The data quality of the BTEX analysis was acceptable and the results were considered usable. A trip blank was collected, analyzed, and was free of target analytes. Overall precision, accuracy, and completeness objectives were met.





Appendix H
Land Surveying Data

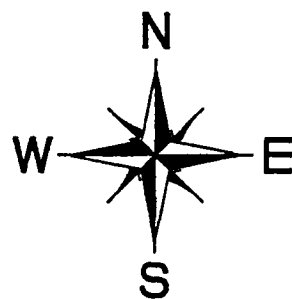
THIS MAP CORRECTLY REPRESENTS A SURVEY DONE UNDER MY SUPERVISION



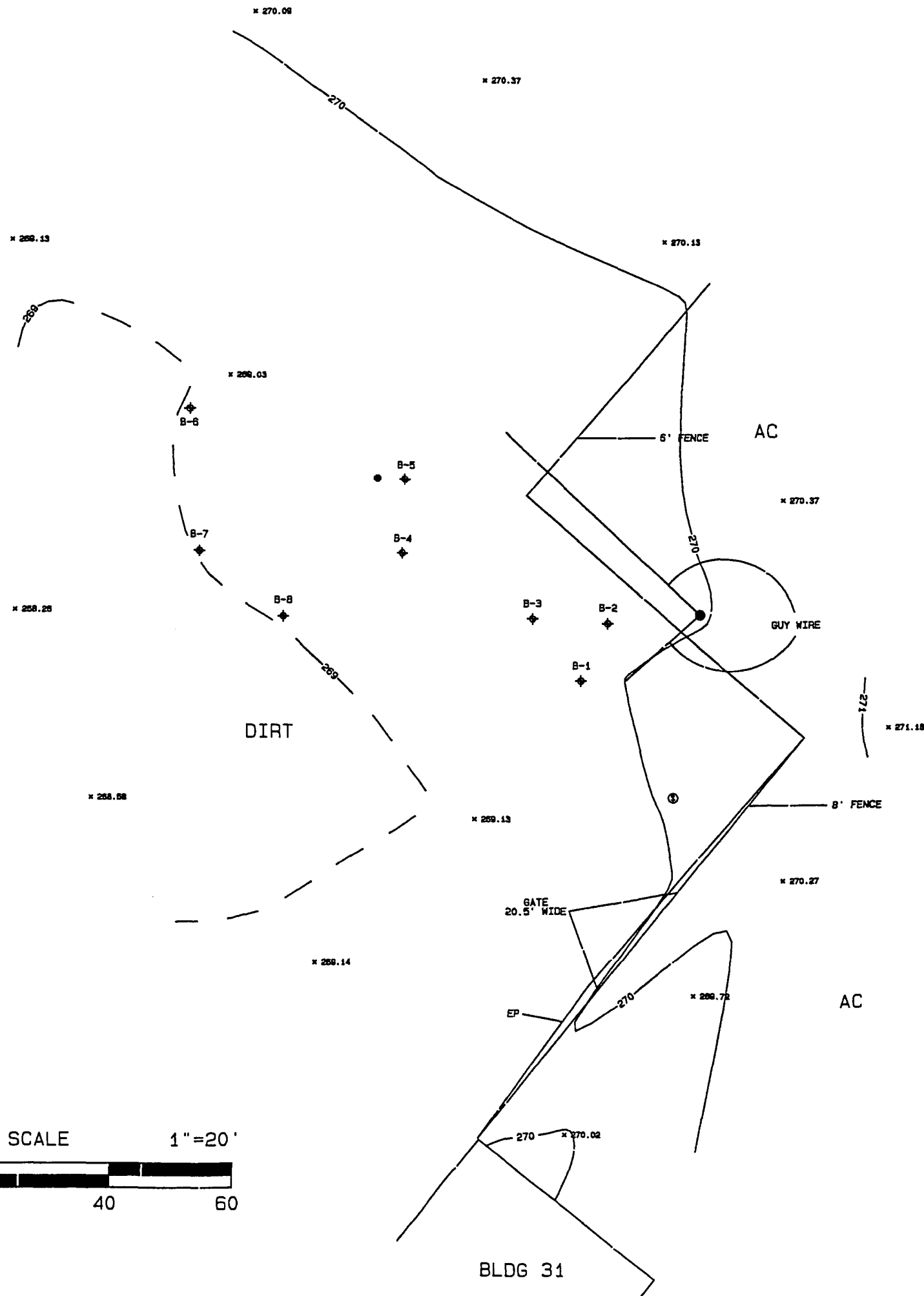
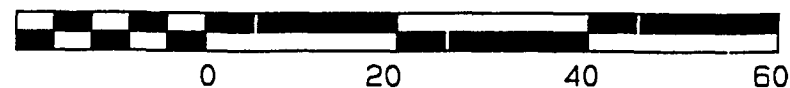
DOANE D. HOLMES, LS 6168
EXPIRES 03-31-98



-  BORE HOLE
 MW 51
 POWER POLE
 SEWER MANHOLE



GRAPHIC SCALE

$$1'' = 20'$$


Control Point

```
#104
N = 2192444.988
6107423.541
Elev = 270.97
Desc: PK Nail and Tin
```

COAST SURVEYING, INC.
P. O. BOX 5991
IRVINE, CALIFORNIA 92716-5991
(714) 453-8801

IRP 15.1

PREPARED FOR:

QWM REMEDIATION SERVICES
202 KETTNER BLVD, STE 3400
SAN DIEGO, CA 92101
(619) 239-1590

1" - 20'	FROM 2/9/26	TO 2/9/26
	D. HOLMES	
	H. JESTER	
	H. JESTER	

SCALE	
SURVEYED	
P.M.	
CALCULATED	
DRAWN	

[illegible][illegible]

REVISIONS

DATE FEB 14, 1998
JOB NUMBER 96-5232

SHEET
1
OF 1